207

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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BELL SOUND MODEL 2200

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

BELL SOUND MODEL 2200

BELL SOUND MODEL 2200

TRADE NAME	Bell Sound Model 2200
MANUFACTURER	Bell Sound Systems, Inc., 555 Marion Rd., Columbus, Ohio
TYPE SET	AC Operated 7 Channel Audio Amplifier
TUBES (Seven)	Types 12SC7 Pre. Amp., 6SL7GT AF Amp., 6SN7GTA Phase Inv., 6SL7GT Driver, (2) 5881 Audio Output, 5U4G LV Rectifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycles RATING 1.24 Amp @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		Bell Sound PART No.	STANDARD REPLACEMENT		
V1	Pre Amplifier	12SC7	12SC7	8S	
V2	AF Amplifier	6SL7GT	6SL7GT	8BD	
V3	Phase Inverter	6SN7GTA	6SN7GTA	8BD	
V4	Driver	6SL7GT	6SL7GT	8BD	
V5	Audio Output	5881	5881	7AC	
V6	Audio Output	5881	5881	7AC	
V7	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Bell Sound PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	20	450		AFH4-14		D013		FP444	TVL-4763	
B	▲20	450								
C	■20	450								
D	▲20	450								
C2A	■20	450		AFH2-51		B040		FP234	TVL-2755	
B	▲20	450		PRS50/50		BR505		TC39	TVA-1308	
C	50	50								
C3A	▲20	450		AFH2-51		B040		FP234	TVL-2755	
B	■20	450								
C4	150	15		PRS150/150		BRH5015		TC1502	TVA-1311	
C5	.25	200		P488-25		PJ2P25		PT4025	2TM-P25	Note 1
C6	10000			BPD-01	DD-1032	TM5S1	811-01	DC-511	5HK-S1	
C7	.004	400		P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C8	.003	400		P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C9	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C10	.001	400		P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C11	470	500		1469-0005		5R5T5		MCB245	MS-35	
C12	47	500		1469-00005		5R5Q5		MCB225	MS-45	
C13	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C14	47	500		1469-00005		5R5Q5		MCB225	MS-45	
C15	.02	400		P488-02	DD-203	PTE4S2		PT412	4TM-S2	
C16	.02	600		P688-02	DD-203	PTE4S2		PT612	6TM-S2	
C17	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C18	200	500		1469-0002		5R5T2		MCB237	MS-32	
C19	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C20	.001	400		P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C21	.01	400		P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C22	.004	400		P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C23	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C24	.1	600		P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C25	200	500		1469-0002		5R5T2		MCB237	MS-32	
C26	.1	600		P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C27	.02	600		P688-02	DD-203	PTE6S2		PT612	6TM-S2	
C28	.02	600		P688-02	DD-203	PTE6S2		PT612	6TM-S2	
C29	270	500		1469-0003		5R5T3		MCB241	MS-33	
C30	.05	600		P688-05	DF-503	PTE6S5		PT615	6TM-S5	

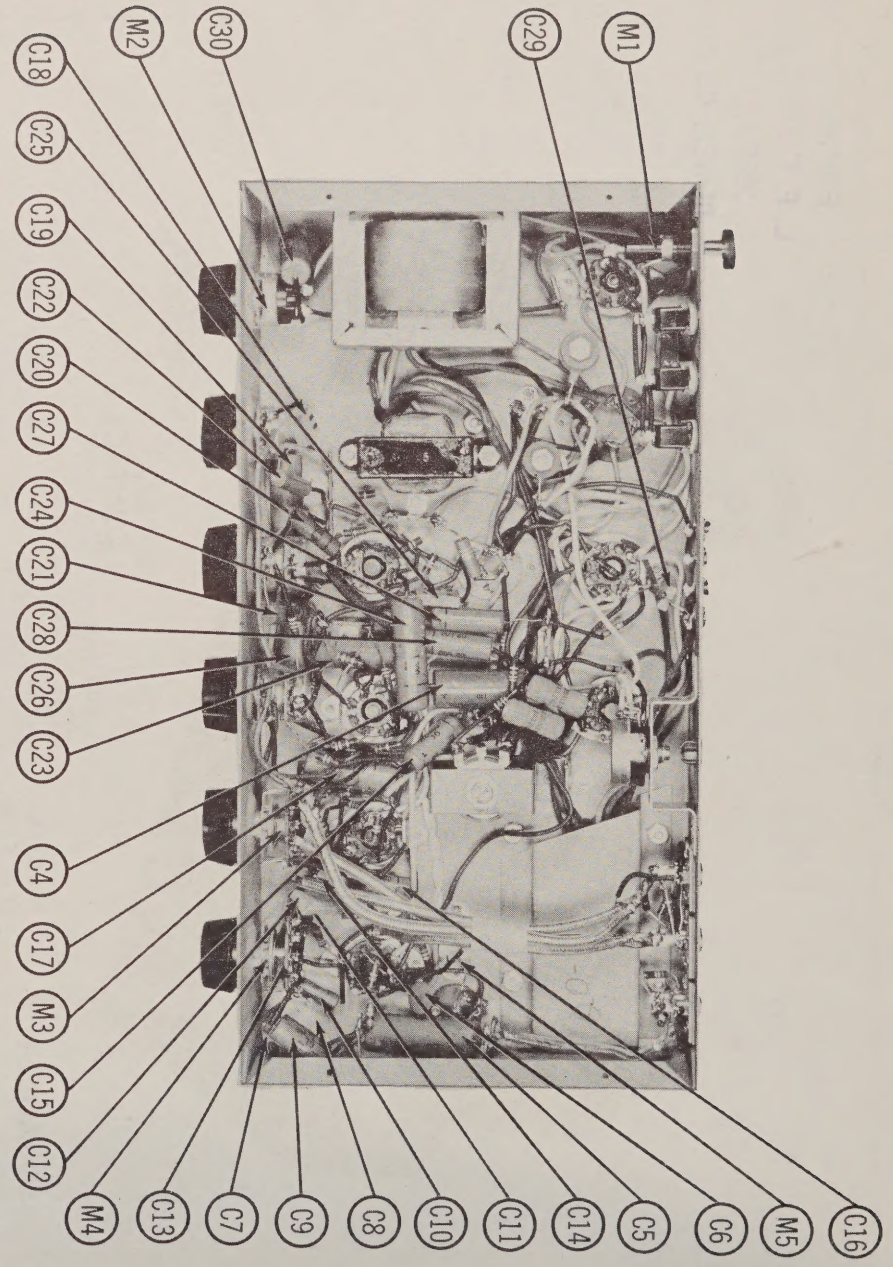
Note 1 Some models use .1 MFD in this application

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Bell-Sound PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	*	½	B20066P114					Treble
R2A	3 Meg	½	B20066P113					Bass
B	1 Meg	½						
R3A	250KΩ	½	B20066P112					Volume
B	500KΩ	½						
R4A	100Ω	2	B20066P115	W-100	A43-100	VK-121	R100L	Balance-Wire Wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R4A
R5A	100Ω	2	B20066P115	W-100	A43-100	VK-121	R100L	Hum Balance-Wire Wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R5A

* Open in center-Approximately 3 Meg on one side and 300KΩ on the other side.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Bell - Sound PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R6	150KΩ	1/2		BTS-150K	
R7	47KΩ	1/2		BTS-47K	
R8	1.2Meg	1/2		BTS-1.2Meg	
R9	27KΩ	1/2		BTS-27K	
R10	10KΩ	1/2		BTS-10K	
R11	10Meg	1/2		BTS-10Meg	
R12	27KΩ	1/2		BTS-27K	
R13	10Meg	1/2		BTS-10Meg	
R14	27KΩ	1/2		BTS-27K	
R15	1.2Meg	1/2		BTS-1.2Meg	
R16	1.2Meg	1/2		BTS-1.2Meg	
R17	1.2Meg	1/2		BTS-1.2Meg	
R18	820KΩ	1/2		BTS-820K	
R19	10Meg	1/2		BTS-10Meg	
R20	10Meg	1/2		BTS-10Meg	
R21	240KΩ-5%	1/2		BTS-240K-5%	
R22	270KΩ	1/2		BTS-270K	
R23	56KΩ-5%	1/2		BTS-56K-5%	
R24	15KΩ	1/2		BTS-15K	
R25	100KΩ	1/2		BTS-100K	
R26	2200Ω	1/2		BTS-2200	
R27	100KΩ	1/2		BTS-100K	
R28	47KΩ	1/2		BTS-47K	
R29	2200Ω	1/2		BTS-2200	
R30	1.2Meg	1/2		BTS-1.2Meg	
R31	100KΩ	1/2		BTS-100K	
R32	27KΩ	1/2		BTS-27K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Bell-Sound PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R33	330KΩ-5%	1/2		BTS-330K-5%	
R34	33KΩ-5%	1/2		BTS-33K-5%	
R35	33KΩ-5%	1/2		BTS-33K-5%	
R36	10KΩ	1/2		BTS-10K	
R37	3300Ω	1/2		BTS-3300	
R38	100KΩ	1/2		BTS-100K	
R39	100Ω-5%	1/2		BTS-100K	
R40	6800Ω-5%	1/2		BTS-6800-5%	
R41	3300Ω	1/2		BTS-3300	
R42	56KΩ-5%	1/2		BTS-56K-5%	
R43	2.2Meg	1/2		BTS-2.2Meg	
R44	56KΩ-5%	1/2		BTS-56K-5%	
R45	1.2Meg	1/2		BTS-1.2Meg	
R46	1500Ω	1/2		BTS-1500	
R47	3300Ω	1/2		BTS-3300	
R48	1.2Meg	1/2		BTS-1.2Meg	
R49	100KΩ	1/2		BTS-100K	
R50	100KΩ	1/2		BTS-100K	
R51	1000Ω	1/2			
R52	470KΩ	1/2		BTS-470K	
R53	250Ω	5		1 3/4A-250	
R54	250Ω	5		1 3/4A-250	
R55	470KΩ	1/2		BTS-470K	
R56	1000Ω	1/2			
R57	18KΩ	1		BTA-18K	
R58	8000Ω	20		2D-8000	
R59	2000Ω	10		1 3/4A-2000	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Bell Sound PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @1.24A	810VCT .148ADC	5VAC @3A	6.3VAC @3A	B-20236	PC-8412	P-3155	PV-200 ①	

@ Drill new mounting holes

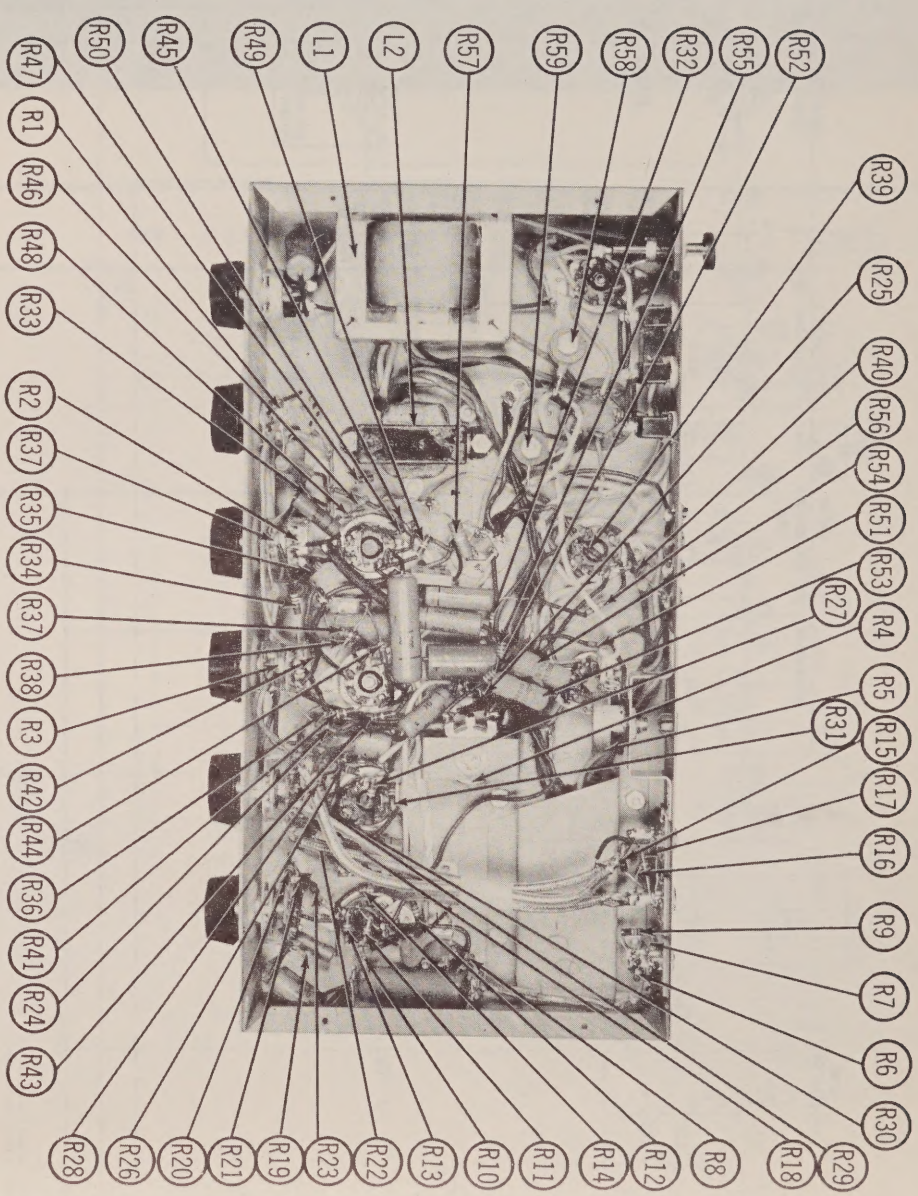
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA Bell Sound PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T2	6KΩCT	16Ω Tap @8Ω 4Ω Cathode 108ΩCT	418ΩCT	87Ω Tap @.76Ω .68Ω Cathode 42.4ΩCT	B-20235					

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA Bell Sound PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.140ADC	90Ω	4.8 Hy.	B-20055	C-1710			C-13X
L2	.008ADC	550Ω	10 Hy.	B-20058	C-1515	C-2981		

CHASSIS—BOTTOM VIEW



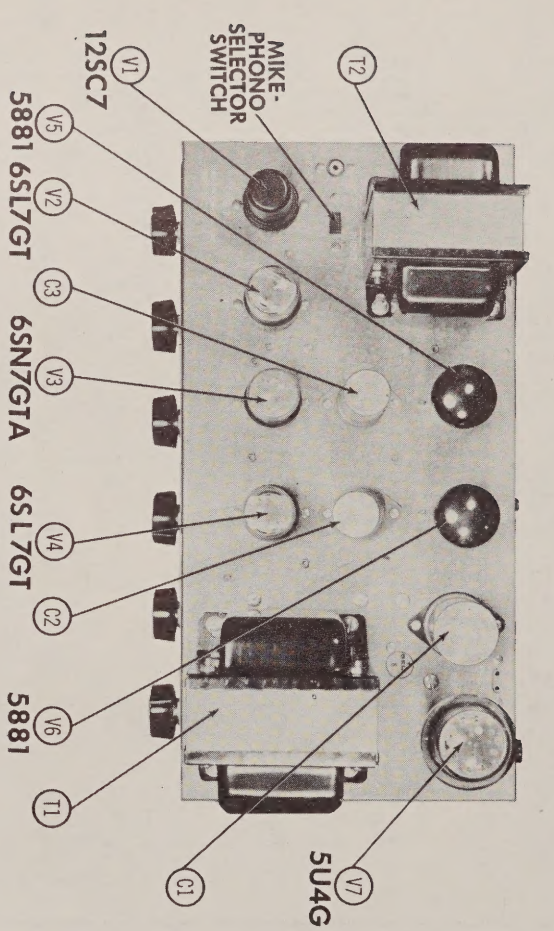
PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Bell-Sound PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1 6/10A 125V (Slo-Blo)			31301.6 (3AG-1 6/10A-	342001	MDL-1 6/10	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Bell-Sound PART No.	NOTES
M2	Switch		Power (Off/On)
M3	Switch		Input Selector
M4	Switch		Frequency Equalizer
M5	Switch		Mike-Phono Selector



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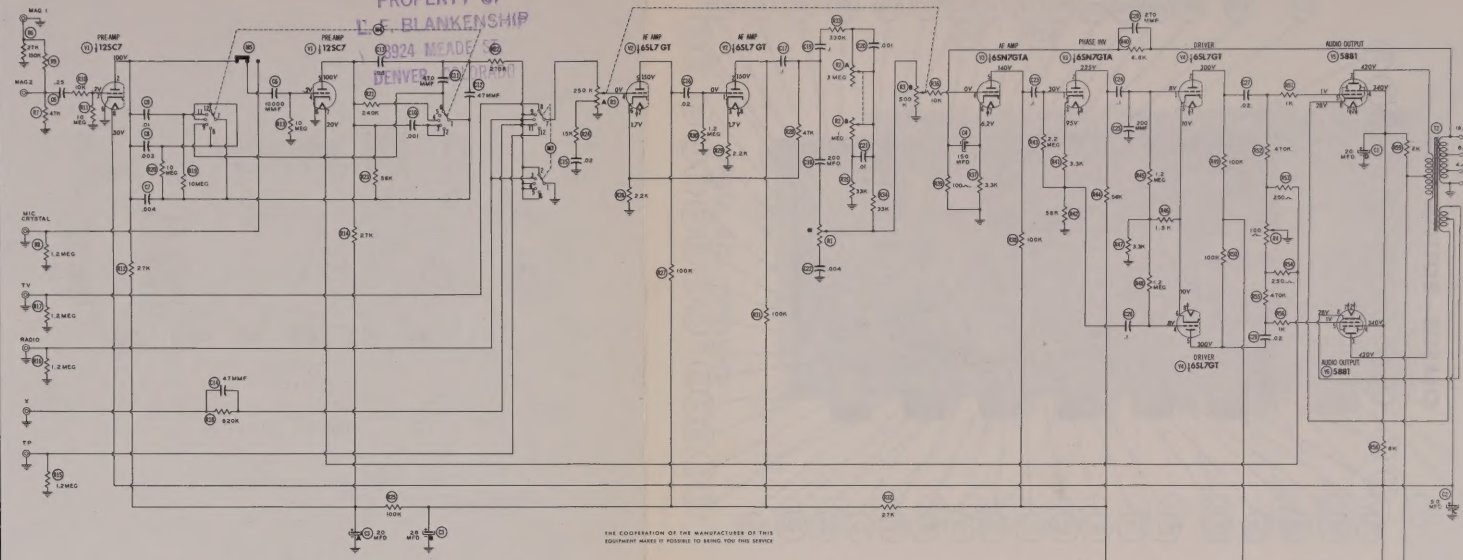
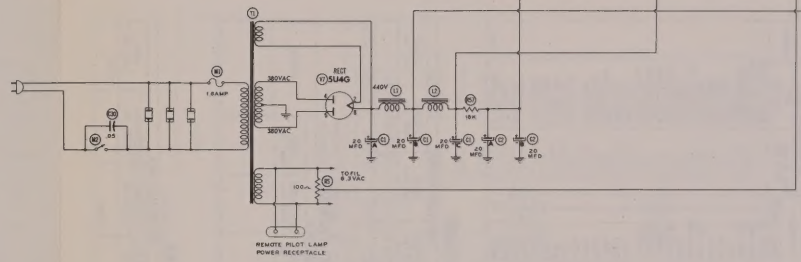
1924 MEADE ST.
DENVER, COLORADO





EQUALIZER SWITCH (M4) SHOWN IN POSITION "E".
SWITCH SEQUENCE
1.- A
2.- B
3.- C
4.- D
5.- E

INPUT SELECTOR SWITCH (M3) SHOWN IN TV POSITION
SWITCH SEQUENCE
1.- TV
2.- MAG.
3.- RADIO
4.- XTAL
5.- TAPE

✱ SEE PARTS LIST FOR VALUE AND APPLICATION

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 Volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SC7	0Ω	†172KΩ	10Meg	10Meg	†172KΩ	0Ω	200Ω	200Ω
V 2	6SL7GT	1.2Meg	†145KΩ	2.2KΩ	10Ω	†145KΩ	2.2KΩ	200Ω	200Ω
V 3	6SN7GTA	2.2Meg	†74KΩ	56KΩ	10KΩ	†118KΩ	3.3KΩ	200Ω	200Ω
V 4	6SL7GT	1.2Meg	†100KΩ	4.8KΩ	1.2Meg	†100KΩ	4.8KΩ	200Ω	200Ω
V 5	5881	0Ω	200Ω	†370Ω	†2.1KΩ	470KΩ	100Ω	200Ω	200Ω
V 6	5881	0Ω	200Ω	†320Ω	†2.1KΩ	470KΩ	100Ω	200Ω	200Ω
V 7	5U4G	INF	20KΩ	INF	44Ω	INF	46Ω	INF	20KΩ

† MEASURED TO PIN 2 OF V7
■ 6.3VAC MEASURED ACROSS FILAMENTS.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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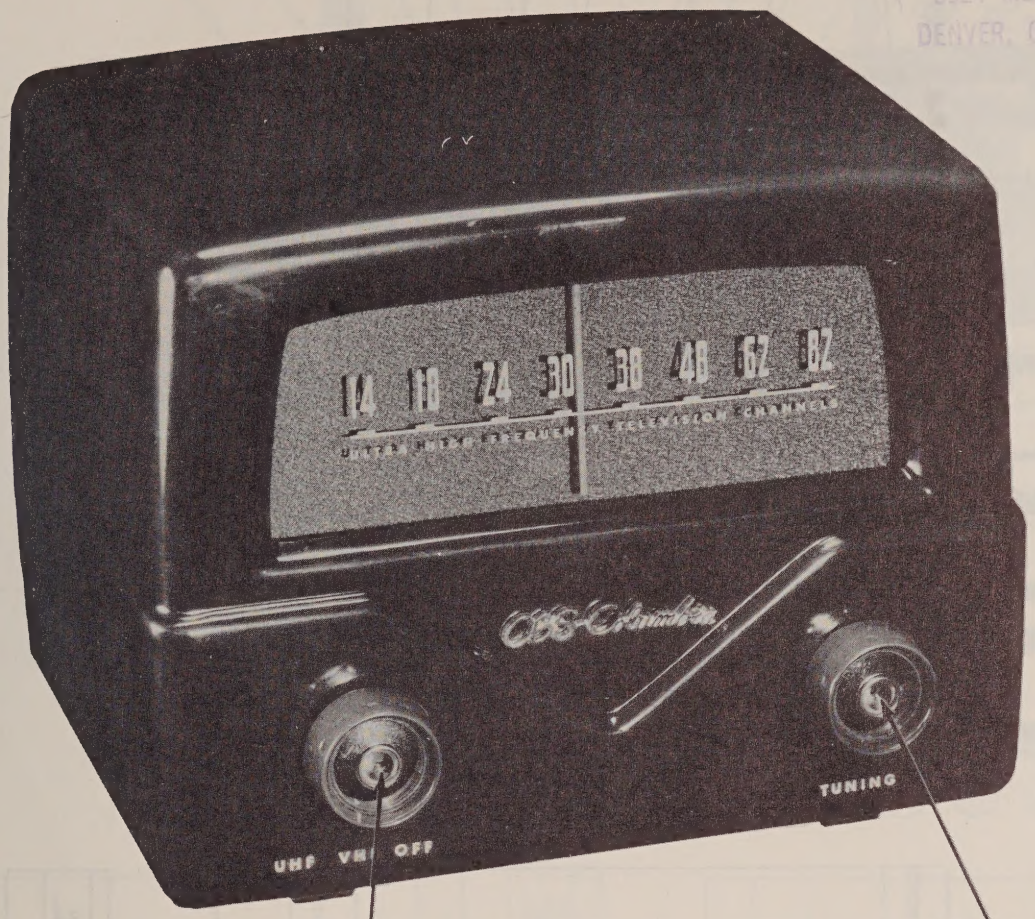
CBS-COLUMBIA
MODEL 2001 (UHF Conv.)

E. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CBS-COLUMBIA
MODEL 2001 (UHF Conv.)



CBS-COLUMBIA
MODEL 2001 (UHF Conv.)

TRADE NAME	CBS-Columbia Model 2001
SUPPLIER	CBS-Columbia Inc., 3400 47th Ave., Long Island City, N. Y.
TYPE SET	AC Operated All Channel UHF Converter
TUBES (Two)	Types: 6AF4 RF Osc., 6CB6 IF Amp.
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .14 Amp. @ 117 Volts AC
TUNING RANGE	Channels 14 Thru 83

THIS CONVERTER HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT SHOULD NOT BE ATTEMPTED IN THE FIELD.

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PARTS LIST AND DESCRIPTIONS

CBS-COLUMBIA
MODEL 2001

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	INSTALLATION NOTES
		CBS-COLUMBIA PART No.	STANDARD REPLACEMENT		
V1	RF Oscillator	6AF4	6AF4	7DK	
V2	IF Amplifier	6CB6	6CB6	7CM	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CBS-COLUMBIA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▪30	150		AFH2-11		B011		FP211	TVL-2422	
B	▲30	150								
C2	1				TCZ-1		NP0K-010		5TCCB-V1	
C3	1				TCZ-1		NP0K-010		5TCCB-V1	
C4	1				TCZ-1		NP0K-010		5TCCB-V1	
C5	.8-6.5									
C6	.4									
C7	.25									
C8	.8-6.5									
C9	1.5			SI1.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C10	2									
C11	.68				TCA-.68		NP0K-R68			
C12	3-10									
C13	10									
C14	68			SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	
C15	68			SI68	D6-680		GP1K-680	UC-5468	5GA-Q68	
C16	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C17	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C18	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C19	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C20	10			SI10	D6-100		GP1K-100	UC-541	5GA-Q1	
C21	10			SI10	D6-100		GP1K-100	UC-541	5GA-Q1	
C22	20			SI20	D6-200		GP1K-200	UC-542	5GA-Q2	
C23	20			SI20	D6-200		GP1K-200	UC-542	5GA-Q2	
C24	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	

RESISTORS

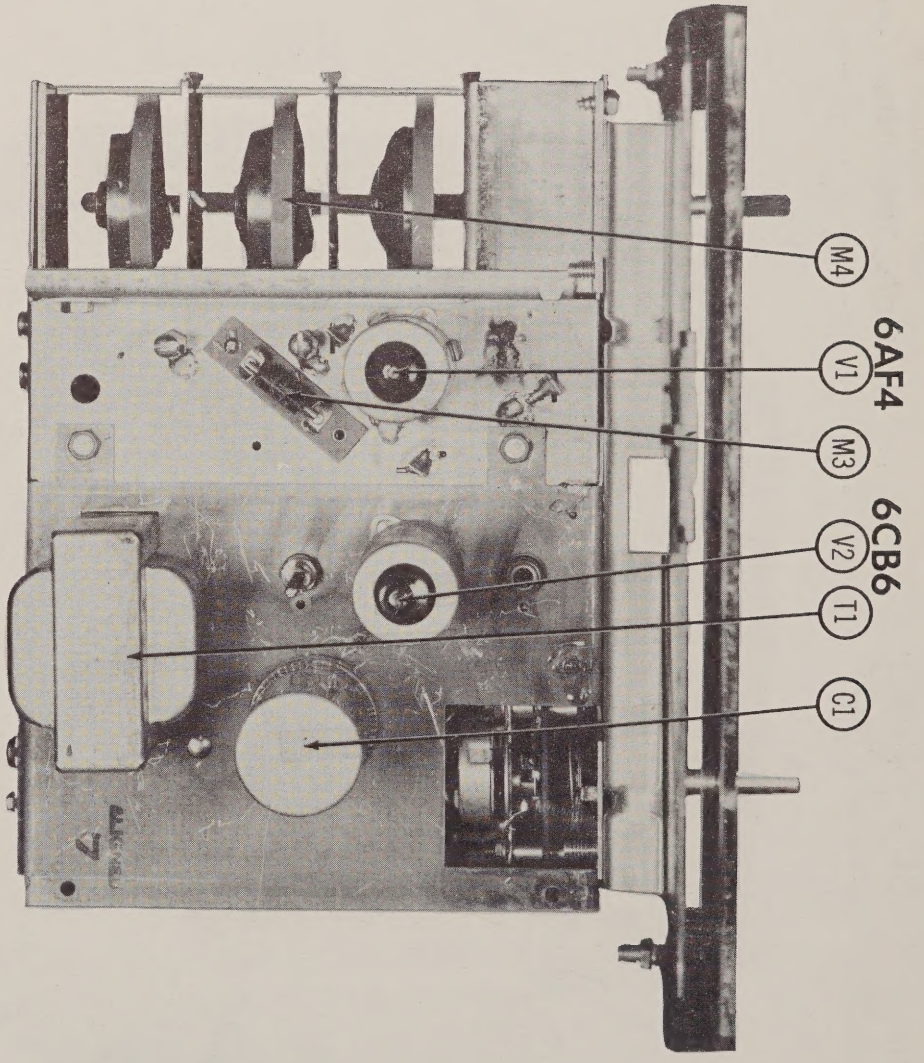
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CBS-Columbia PART No.	IRC PART No.	
R1	1500Ω	½		BTS-1500	
R2	1500Ω	½		BTS-1500	
R3	22Ω	½			
R4	22Ω	½			

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CBS-Columbia PART No.	IRC PART No.	
R5	12KΩ	½		BTS-12K	
R6	470Ω	½		BTS-470	
R7	150Ω	½		BTS-150	
R8	1200Ω	1		BTA-1200	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	CBS-COLUMBIA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117V @ .14A	117V .020ADC	6.3V @ .53A		B-630124-1				

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CBS-COLUMBIA PART No.	REPLACEMENT DATA: MILLER PART No.	REPLACEMENT DATA: MEISSNER PART No.	NOTES
L1	UHF Pre-Selector, Mixer, & Osc. Coils	0Ω					
L2	UHF Pre-Selector Coil End Inductor	0Ω					
L3	UHF Mixer Coil End Inductor	0Ω					
L4	UHF Osc. Coil End Inductor	0Ω					
L5	RF Choke	.1Ω					.38 Microhenry
L6	Cathode Choke	.1Ω					.38 Microhenry
L7	Filament Choke	.1Ω					
L8	Filament Choke	.1Ω					
L9	UHF IF Input Transformer	0Ω	0Ω				
L10	RF Choke	.1Ω					
L11	UHF IF Output Transformer	0Ω	0Ω				
L12	RF Choke	0Ω					

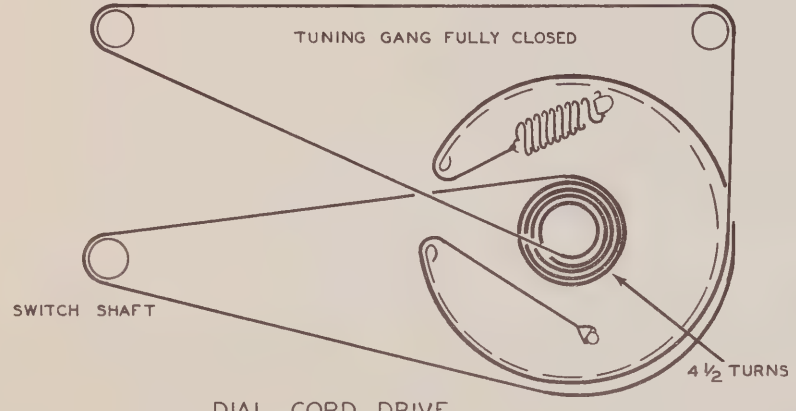
SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: CBS-COLUMBIA PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.
M1	.020 Amp.			8Y1 ①	1214	6S35	35

① Fabricate Mounting Bracket

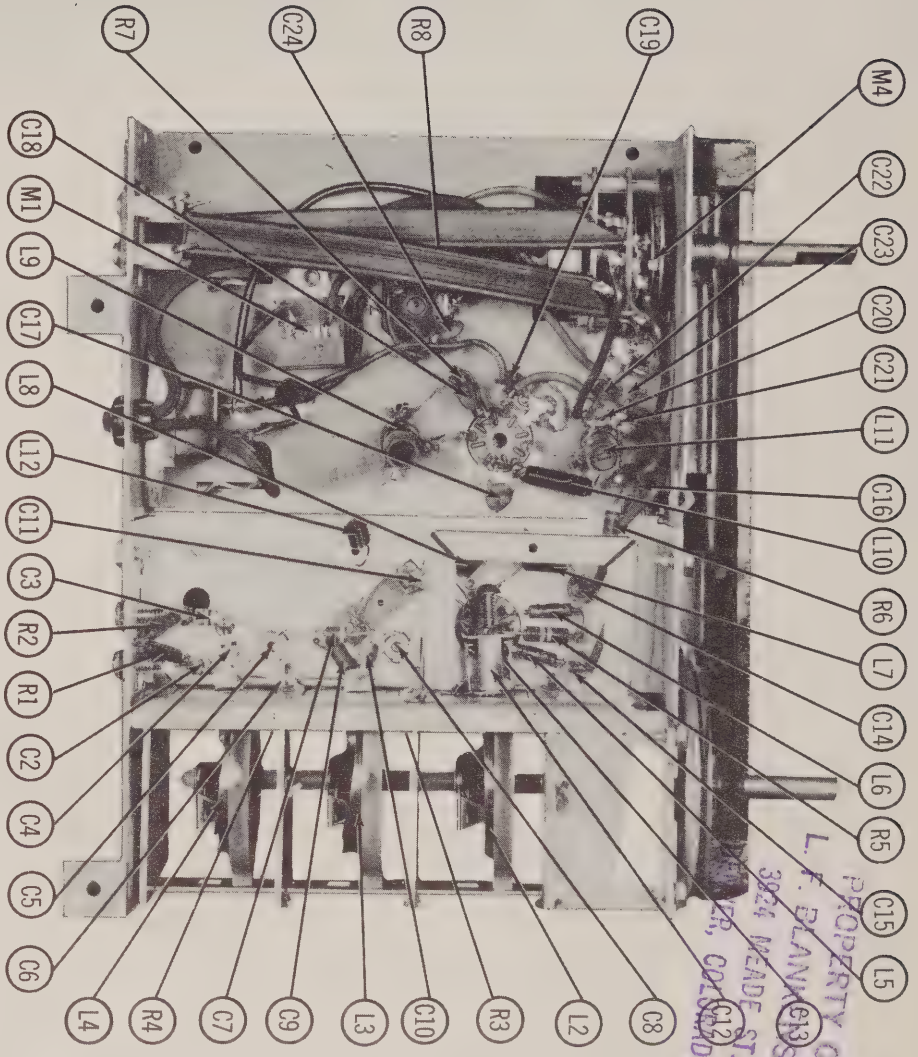
MISCELLANEOUS

ITEM No.	PART NAME	CBS-COLUMBIA PART No.	NOTES
M2	Tuning Assembly		
M3	Crystal		Mixer (1N82)
M4	Switch	573-0007	Function Selector



DIAL CORD DRIVE

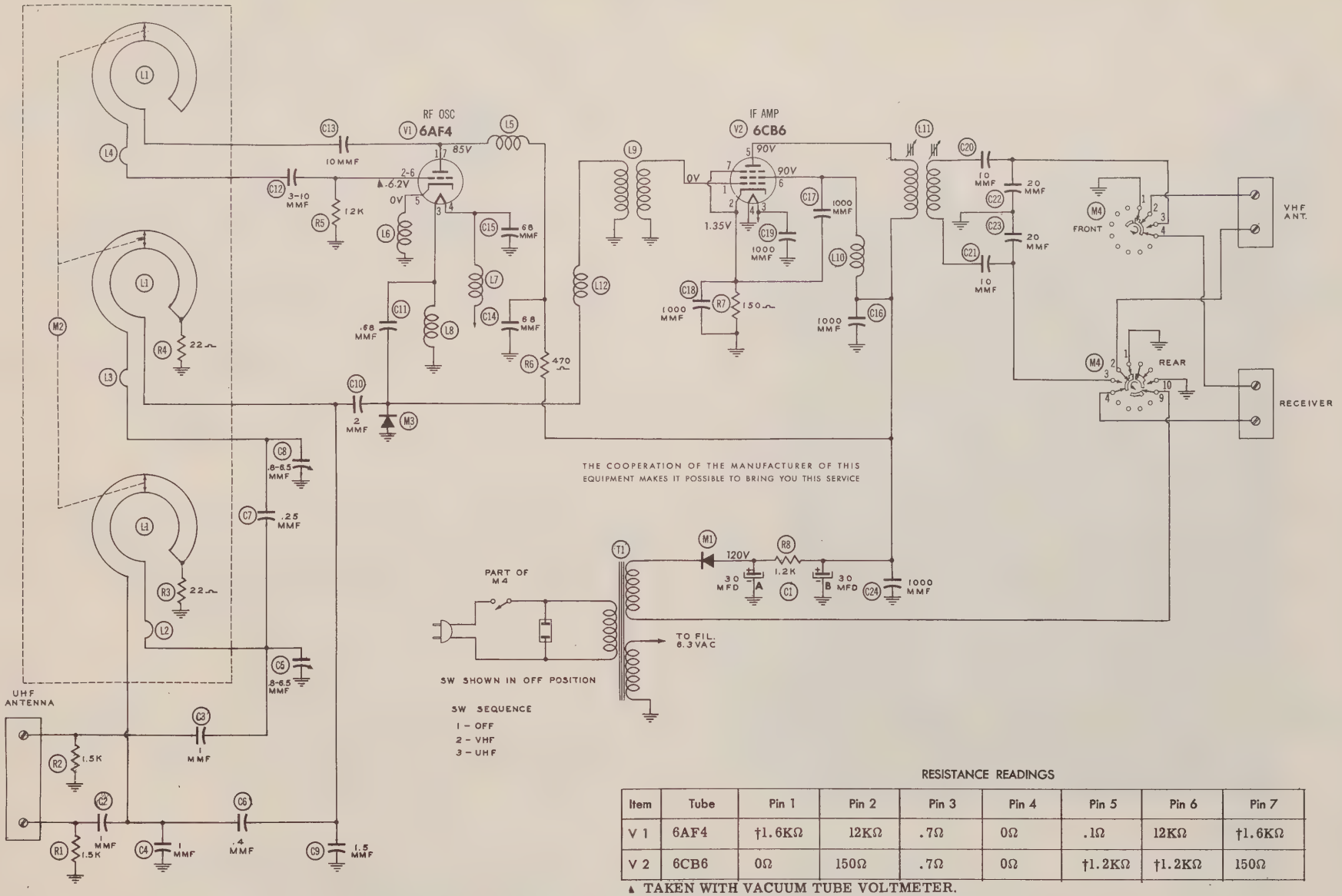
CHASSIS—BOTTOM VIEW



PROPERTY OF
L. F. PLANK SHIP
3824 MEADE ST.
DENVER, COLORADO

CBS-COLUMBIA MODEL 2001

CBS-COLUMBIA MODEL 2001



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6AF4	†1.6KΩ	12KΩ	.7Ω	0Ω	.1Ω	12KΩ	†1.6KΩ
V 2	6CB6	0Ω	150Ω	.7Ω	0Ω	†1.2KΩ	†1.2KΩ	150Ω

▲ TAKEN WITH VACUUM TUBE VOLTMETER.
† MEASURED FROM OUTPUT OF M1.
READINGS TAKEN WITH FUNCTION SWITCH IS UHF POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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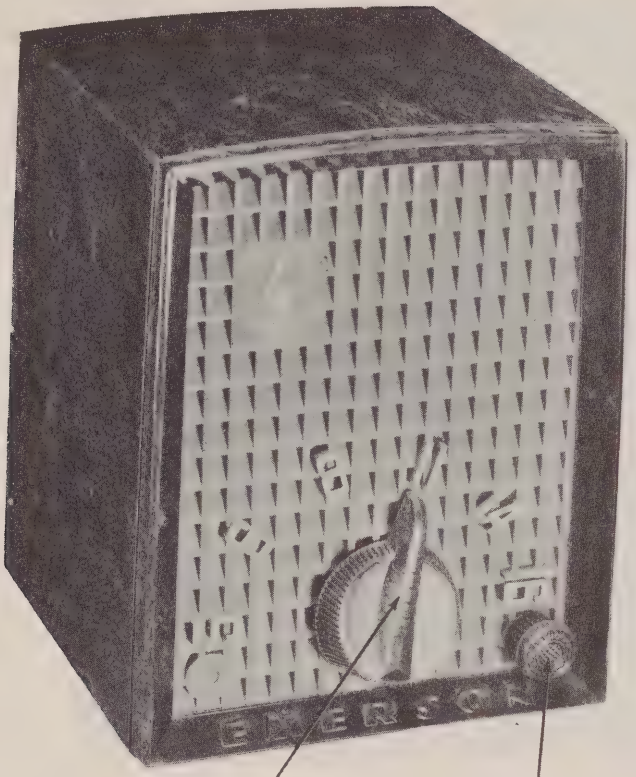
207-2

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.

EMERSON
MODELS 737A, B (Ch. 120172A, B)

L F
3024
DENVER, COLORADO

EMERSON
MODELS 737A, B (Ch. 120172A, B)



EMERSON
MODELS 737A, B (Ch. 120172A, B)

TRADE NAME	Emerson Models 737A, B (Ch. 120172A, B)
MANUFACTURER	Emerson Radio & Phono Corp., 111 8th. Ave., New York, N.Y.
TYPE SET	AC/DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC/DC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620 KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.001MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
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PARTS LIST AND DESCRIPTIONS

EMERSON
MODEL 737A (Ch. 120172A)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		EMERSON PART No.	STANDARD REPLACEMENT		
V1	Converter	800525	12BE6	7CH	
V2	IF Amplifier	800524	12BA6	7BK	
V3	Det.-AVC-AF Amp.	800523	12AT6	7BT	
V4	Audio Output	800032	50C5	7CV	
V5	Rectifier	800526	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	30	150	925218	PRS150/30-50		EDL5315		2N520	TVA-2450	Red Green
B	50	150								
C2	.05	400	923554	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C3A	220									
B	.002									
C	250		♦923024		♦PC-150		♦1408-01		♦103C4	
D										
E	.005									
C4	.02	400	923524	P488-02	DD-203	PTE4S2		PT412	4TM-S2	
C5	.05	400	923554	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C6	.1	400	923515	P488-1	DF-104	PTE4P1		PT401	4TM-P1	

♦ Items C3A, C3B, C3C, C3D, C3E, R5A, R5B, R5C are combined in one unit.
When replacing items separately C3C and C3D should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	390205	Q11-133	AG-58-S	AB-59	U-50	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	KB-1	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R2	22KΩ	½		BTS-22K	
R3	120Ω	½	340272	BTS-120	
R4	3.3Meg	½	351332	BTS-3.3Meg	
R5A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	♦923024	BTS-470K	
C	470KΩ	½		BTS-470K	

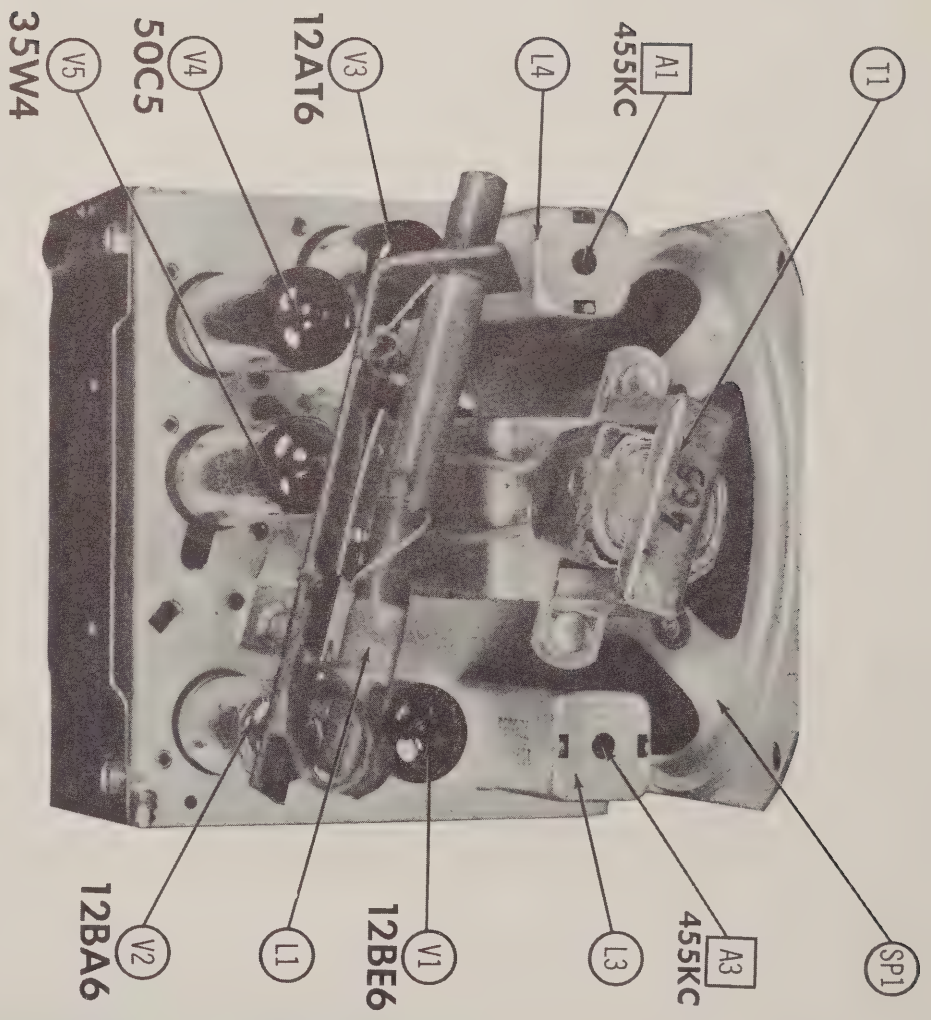
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R6	560Ω	½		BTS-560	Note
R7	150Ω	½	340292	BTS-150	
R8	1500Ω	1	380532	BTA-1500	
R9	18Ω	½	340072		

Note . Some Models use a 10KΩ resistor in this application.
♦ Items R5A, R5B, R5C, C3A, C3B, C3C, C3D and C3E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		EMERSON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	1.96KΩ	3.2Ω	196Ω	.66Ω	Part of spkr.	A-3332	A-3025	RO-2 ①	S-1X ①	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	EMERSON PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.2Ω	180110 180084 ①	ST-113 Mod. P4-X	4A07	① Alternate PM speaker

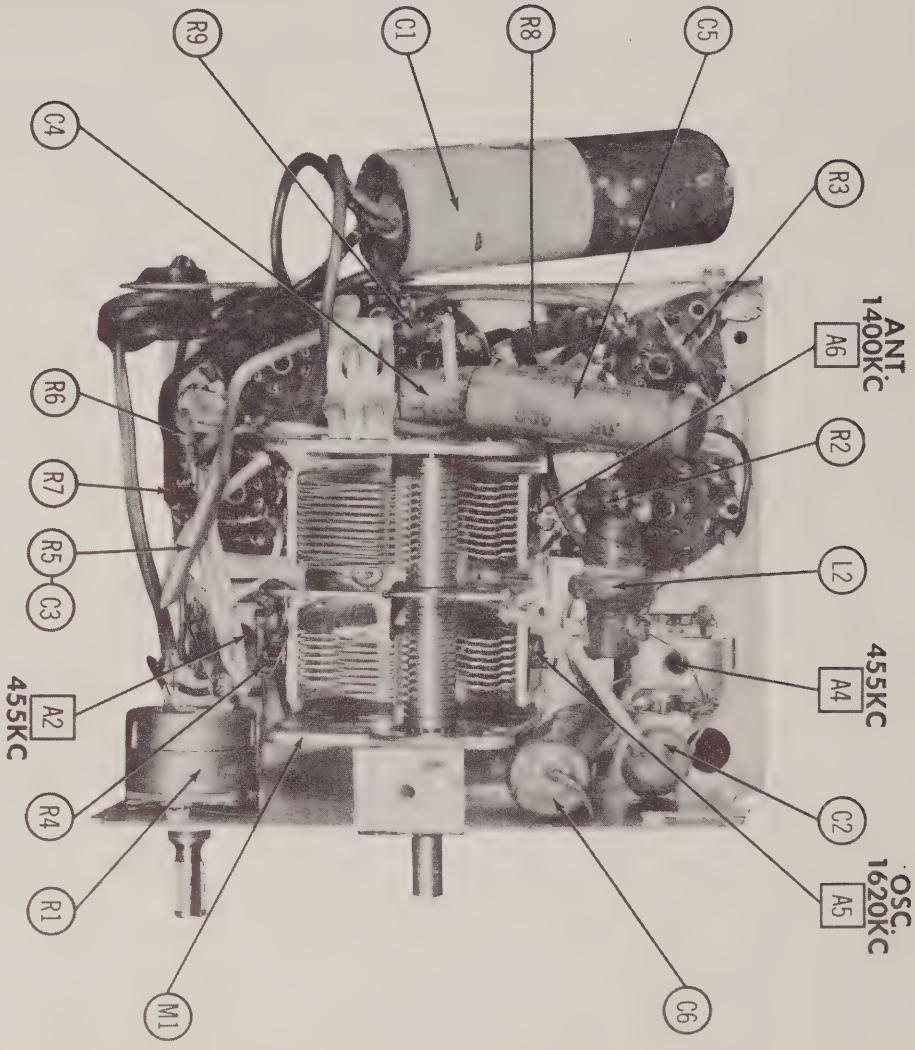
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	EMERSON PART No.	MILLER PART No.	MEISSNER PART No.	
L1	Loop Ant.	.6Ω		700078			
L2	Osc.Coil	.8Ω	6.8Ω	716071		14-1073	
L3	Input IF	17Ω	16Ω	720033	12-C1	16-6758	
L4	Output IF	17Ω	16Ω	720033	12-C2	16-6758	

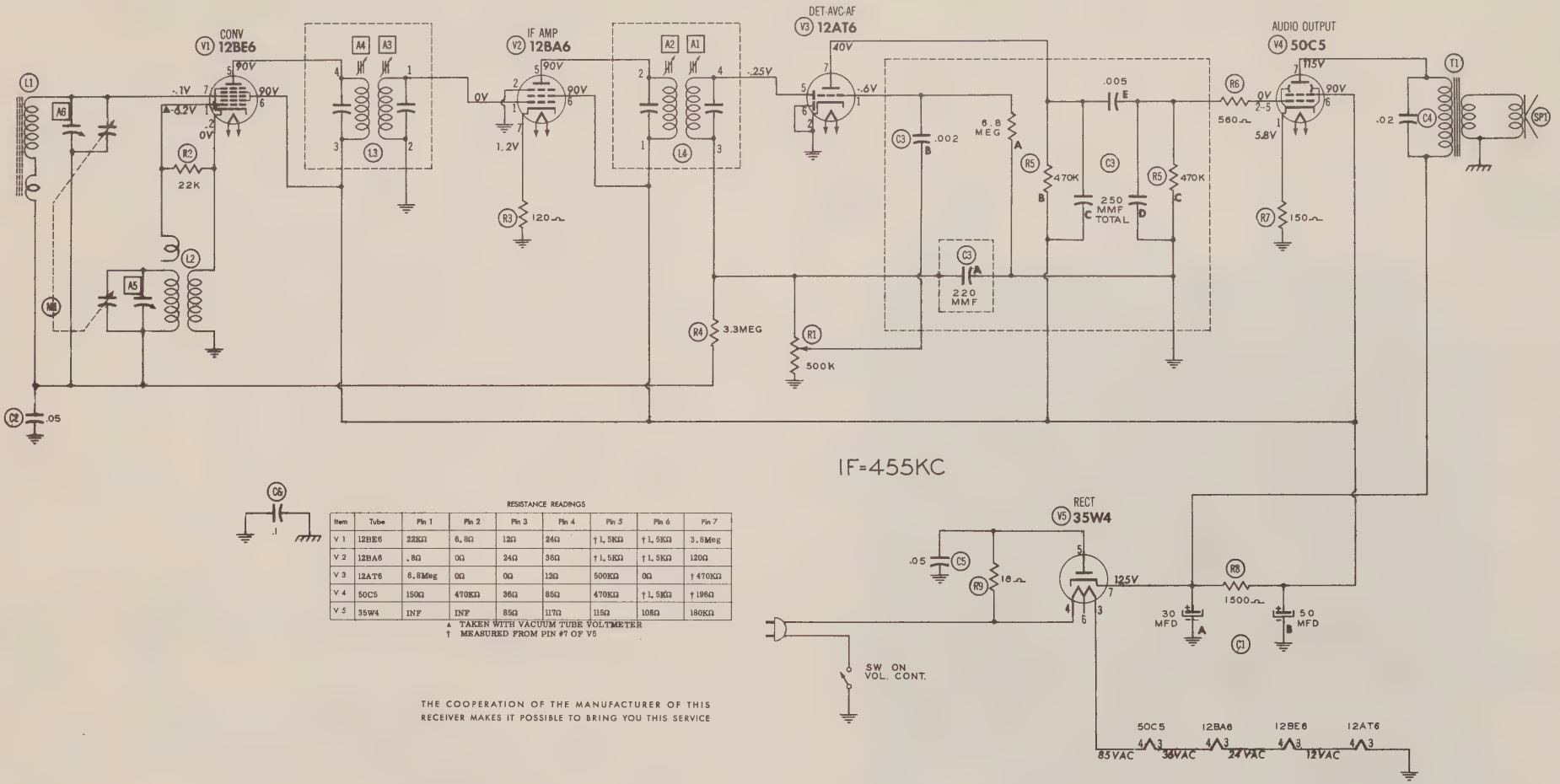
MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M1	Tuning Capacitor	900086	35-379MMF, 27-177MMF
	Cabinet	140450	
	Front Plate	140451A	
	Back	575839	
	Knob	460376	Tuning
	Knob	460377	Off/On Volume

CHASSIS—BOTTOM VIEW



EMERSON MODEL 737A (Ch. 120172A)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	6.8Ω	12Ω	24Ω	†1.5KΩ	†1.5KΩ	3.8Meg
V 2	12BA6	.8Ω	0Ω	24Ω	36Ω	†1.5KΩ	†1.5KΩ	120Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	0Ω	†470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	85Ω	470KΩ	†1.5KΩ	†196Ω
V 5	35W4	INF	INF	85Ω	117Ω	115Ω	108Ω	180KΩ

▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN #7 OF V5

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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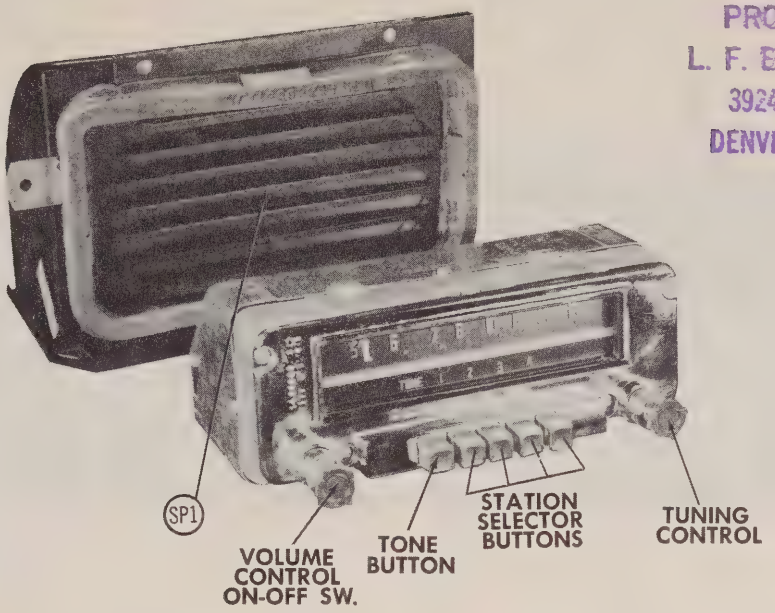
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MOPAR
MODEL 608



TRADE NAME	Mopar Model 608 (For 1953 Plymouth Model P-24 Automobiles)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	Battery Operated Custom Built AM Superheterodyne Receiver
TUBES (Six)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AT6 Det.-AVC-AF Amp., 6AQ5 Audio Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 6.7 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Set tone control to "high" position.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400 Mod.)	Extreme high frequency end of dial.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	Fig. 1	Thru dummy to antenna receptacle	1610KC	"	"	A5, A6, A7	Preset A8, A9 and A10 so that 1 3/16" of core projects from end of coil. Adjust A5, A6 and A7 in order given for maximum output.
3.	"	"	1400KC	Tune manually to place pointer as in Fig. 2.	"	A8, A9 A10	Adjust in order given for maximum output.
4.	"	"	1610KC	Tune to 1610KC signal	"	A6, A7	"
5.	"	"	1400KC	Tune to 1400KC signal	"	A9, A10	"
6.	Repeat Step 4.						

With receiver in car and antenna fully extended tune in weak signal near 1400KC and adjust A7 for maximum volume.

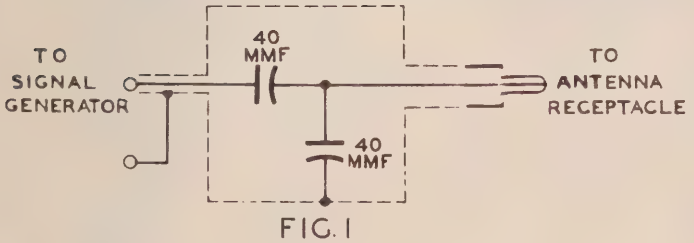


FIG. 1

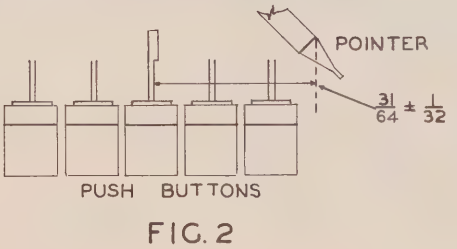


FIG. 2

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4	Det.-AVC-AF Amp.	6AT6	6AT6	7BT	
V5	Audio Output	6AQ5	6AQ5	7BQ	
V6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTE
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■15	350	23A485677	AFH3-104		CO77		FP328	TVL-3630	
B	▲10	350								
C	20	25								
C2	90		21A591682							
C3	.006	100	8A4529	P488-006		PJ6D6	GP2-333-602	PT626	6TM-D6	
C4	.05	200	8R13514	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C5	.05	400	8R14791	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C6	5		21K70720	SI5	TCZ-5	5W5V5	GP1K-050	ZT-555	5GA-V5	
C7	47	500	21R6513	1469-00005		5R5Q5		MCB225	MS-45	
C8	100		21K502141							
C9	5		21K70720	SI5	TCZ-4.7	5W5V5	GP1K-050	ZT-555	5GA-V5	
C10	.006	100	8A4529	P488-006		PJ6D6	GP2-333-602	PT626	6TM-D6	
C11	.006	400	8K71910	P488-006		PJ6D6	GP2-333-602	PT626	6TM-D6	
C12	.03	400	8R71911	P488-03		PJ6S3		PT413	4TM-S3	
C13	500		21R6531	SI500	D6-501	TM5T5	GP2K-501	UC-535	5GA-T5	
C14	.006	400	8K71910	P488-006		PJ6D6	GP2-333-602	PT626	6TM-D6	
C15	.02	1000	8K114137	P1088-02		PTE16S2		PT1612	MB-S2	
C16	.5	100	8C580845	P185-5		MP2P5			68P20	
C17	.5	100	8C580845	P185-5		MP2P5			68P20	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	500KΩ	½	18A521635					Volume & Switch

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	470KΩ	½	6R6032	BTS-470K	
R3	100KΩ	½	6R6075	BTS-100K	
R4	270Ω	½	6R6432	BTS-270	Note
R5	33KΩ	½	6R6012	BTS-33K	
R6	270Ω	½	6R6432	BTS-270	
R7	1 Meg	½	6R6004	BTS-1 Meg	
R8	6800Ω	2	6R90349	BTB-6800	
R9	47KΩ	½	6R6056	BTS-47K	
R10	1 Meg	½	6R6004	BTS-1 Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R11	6800Ω	½	6R6428	BTS-6800	
R12	3.3Meg	½	6R2118	BTS-3.3Meg	
R13	470KΩ	½	6R6032	BTS-470K	
R14	27KΩ	½	6R6434	BTS-27K	
R15	470KΩ	½	6R6032	BTS-470K	
R16	220Ω	1	6R6389	BTA-220	
R17	1000Ω	2	6R476004	BTB-1000	
R18	56Ω	½	6R5614		
R19	56Ω	½	6R5614		

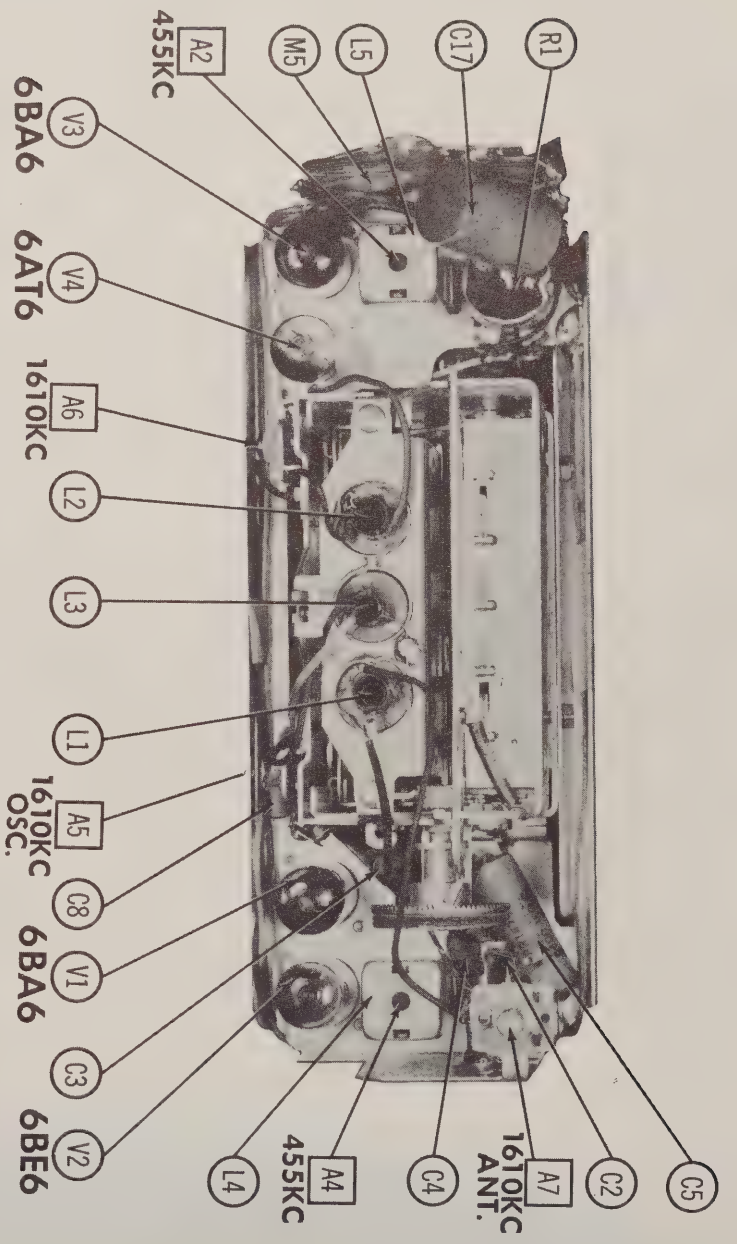
Note . Not used in all models.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	6.3VAC @ 4A	480VCT .050ADC			25C501644		P-3068 ①	VT-2	

① Drill new mounting holes.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	5.3KΩ	3.4Ω	690Ω	.5Ω	25B501684	A-3877 ①	A-3019 ①	RO-9 ①	S-3X ①	① Bend mounting tabs down, file out slots, mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6 x 9	6 volt	3.4Ω	50C510790 50C513430 ① 50K512712 ① 50K521403 ① 50C502449 ② 50C501656 ②	ST-814 Mod. F69-T ST-810 Mod. P69-V	69EV6 69A2	① Alternate EM speakers ② 6 x 9" PM speakers Tape up lead for EM speaker field when using PM speaker

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	MOTOROLA PART No.	MILLER PART No.	MEISSNER PART No.	
L1	Ant. Coil	7.5Ω		24B510507 *			Includes coil & powdered iron sleeve less iron core, part #46A511658. Used in tuner Model AT-112 (part #77K521086)
L2	RF Coil	7.5Ω		24B510508 †			Includes coil & powdered iron sleeve less iron core, core part #46A511658 Used in tuner Model AT-112
L3	Osc. Coil	.8Ω	3Ω	24B510506 ■			Less iron core, core part #46A511658 Used in tuner Model AT-112
L4	Input IF	17.5Ω	16.5Ω	24B485553 ▲	12-C1	16-6758	
L5	Output IF	17Ω	17.5Ω	24K485554	12-C6	16-6770	
L6	Hash Choke	0Ω		24A472535	5221		15.2 Microhenries

▲ Alternate part #24K502819
* Tuner Model AT-111 (part #77K520939) uses part #24B520111 in this application. Less core, core part #46K511937 .
† Tuner Model AT-111 uses part #24B520110 in this application. Less core, part #46K511937.
■ Tuner Model AT-111 uses part #24B520109 in this application. Less core, core part #46K511937

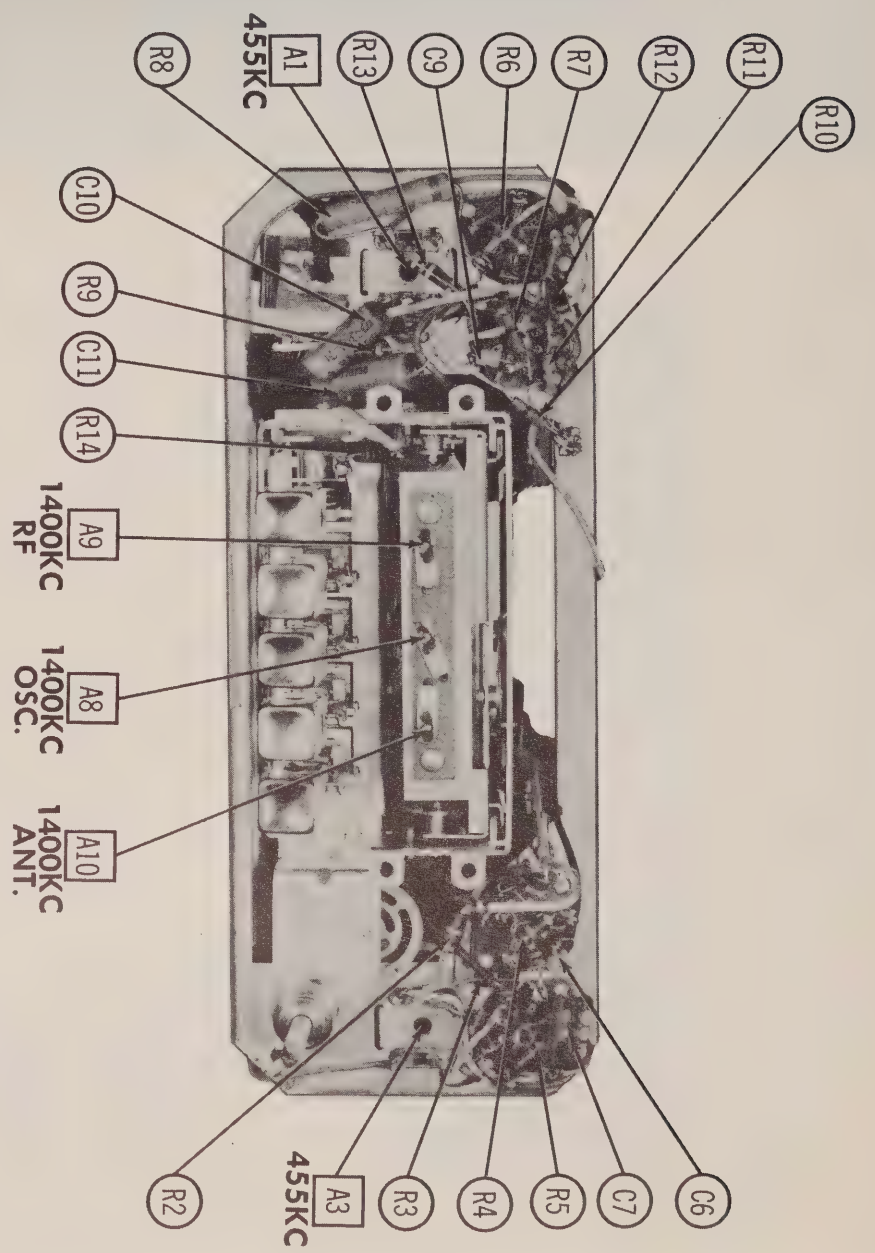
VIBRATOR

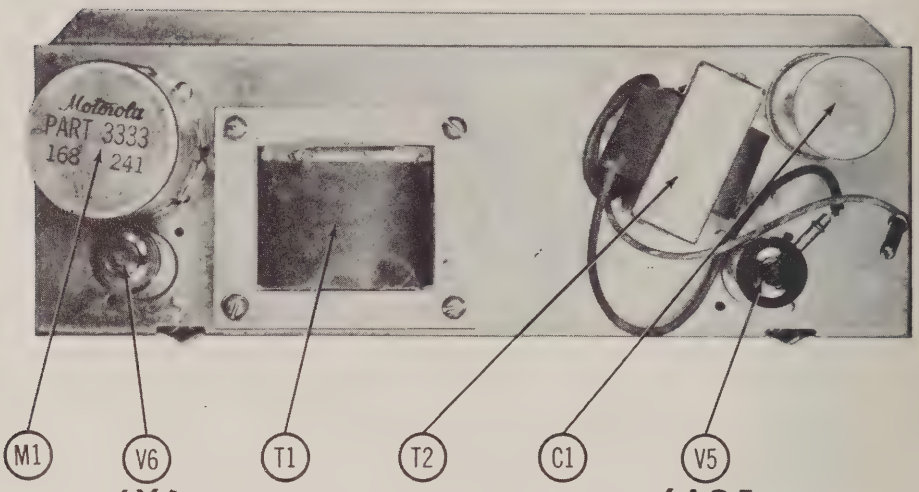
ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115∿	48B3333	5342	859	5342	

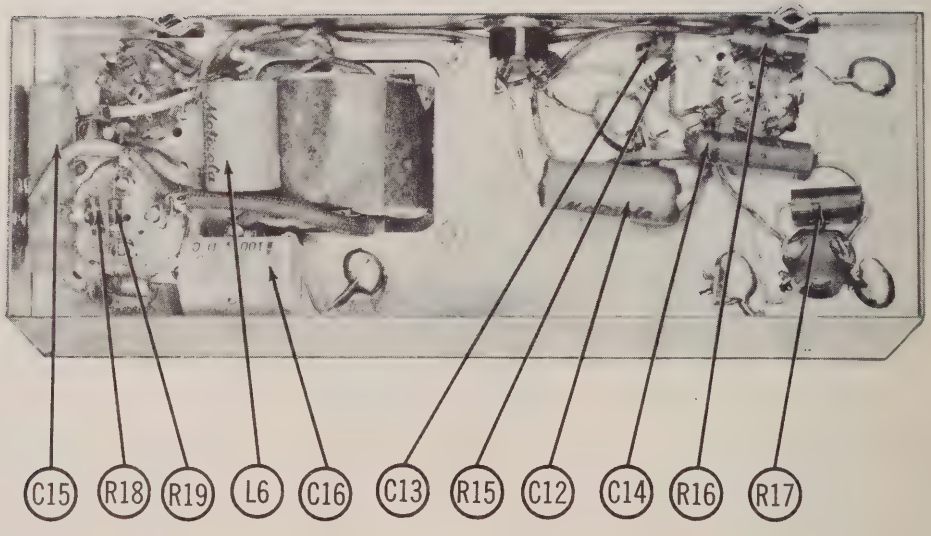
FUSES

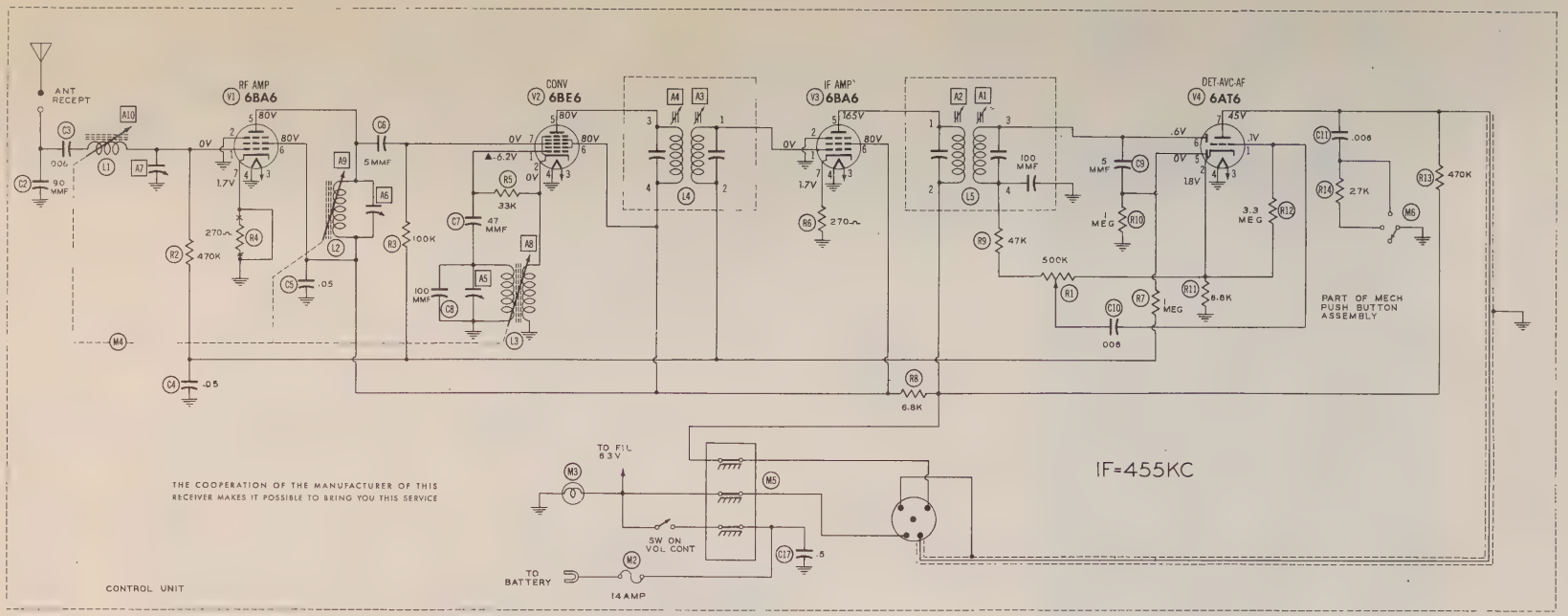
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A 32V	65K12894	9K521118	307014 (SFE-14A)	155014	SFE-14	HDI

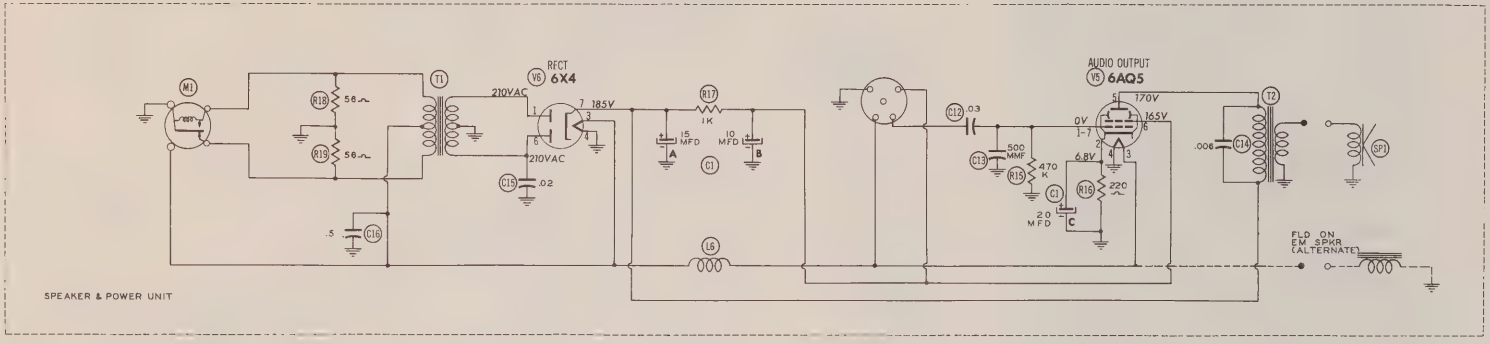
CHASSIS—BOTTOM VIEW




Motorola
PART 3333
168 241
M1
V6
T1
T2
C1
V5
6X4
6AQ5


C15
R18
R19
L6
C16
C13
R15
C12
C14
R16
R17


ANT RECEPT
RF AMP V1 6BA6
CONV V2 6BE6
IF AMP V3 6BA6
DET-AVC-AF V4 6AT6
IF=455KC
PART OF MECH PUSH BUTTON ASSEMBLY
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
TO FIL 6.3V
SW ON VOL CONT
TO BATTERY
14 AMP
CONTROL UNIT



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	2.5Meg	0Ω	.5Ω	0Ω	†8KΩ	†8KΩ	270Ω
V 2	6BE6	33KΩ	.8Ω	.5Ω	0Ω	†8KΩ	†8KΩ	2.1Meg
V 3	6BA6	2 Meg	0Ω	.5Ω	0Ω	†1KΩ	†8KΩ	270Ω
V 4	6AT6	3.3Meg	6.8KΩ	.5Ω	0Ω	1 Meg	550KΩ	†470KΩ
V 5	6AQ5	470KΩ	220Ω	.5Ω	0Ω	†690Ω	†1KΩ	470KΩ
V 6	6X4	375Ω	INF.	.5Ω	0Ω	INF.	410Ω	5 Meg

† MEASURED FROM PIN 1 OF V6
▲ TAKEN WITH VACUUM TUBE VOLTMETER

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1-DC Voltage measurements are at 20,000 ohms per volt: AC Voltages measured at 1000Ω ohms per volt.
2-Socket connections are shown as bottom views.
3-Measured values are from socket pin to common negative.
4-Battery voltage maintained at 6.3Volts for voltage readings.
5-Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6-Volume control at maximum , no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

MUNTZ MODELS 2055, A, AU, B, 2066, 2158A, 2159A, 2162A

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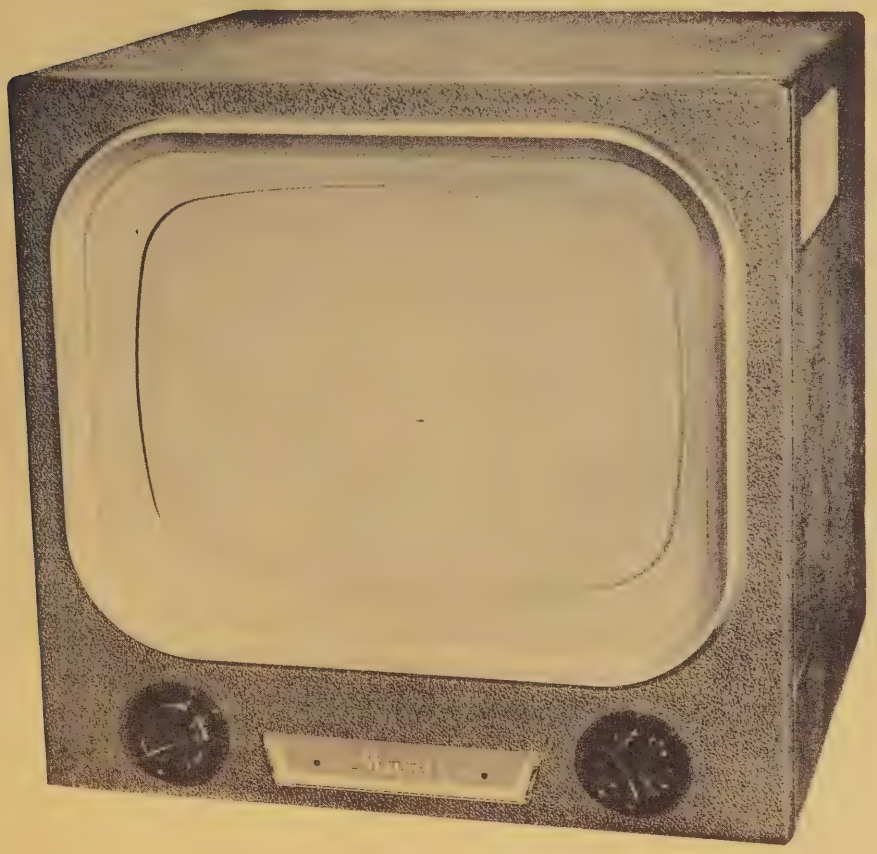

MODEL 2055

MUNTZ
MODELS 2055, A, AU, B, 2066, 2158A, 2159A, 2162A

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DATE 6–53 SET 207 FOLDER 5

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MUNTZ
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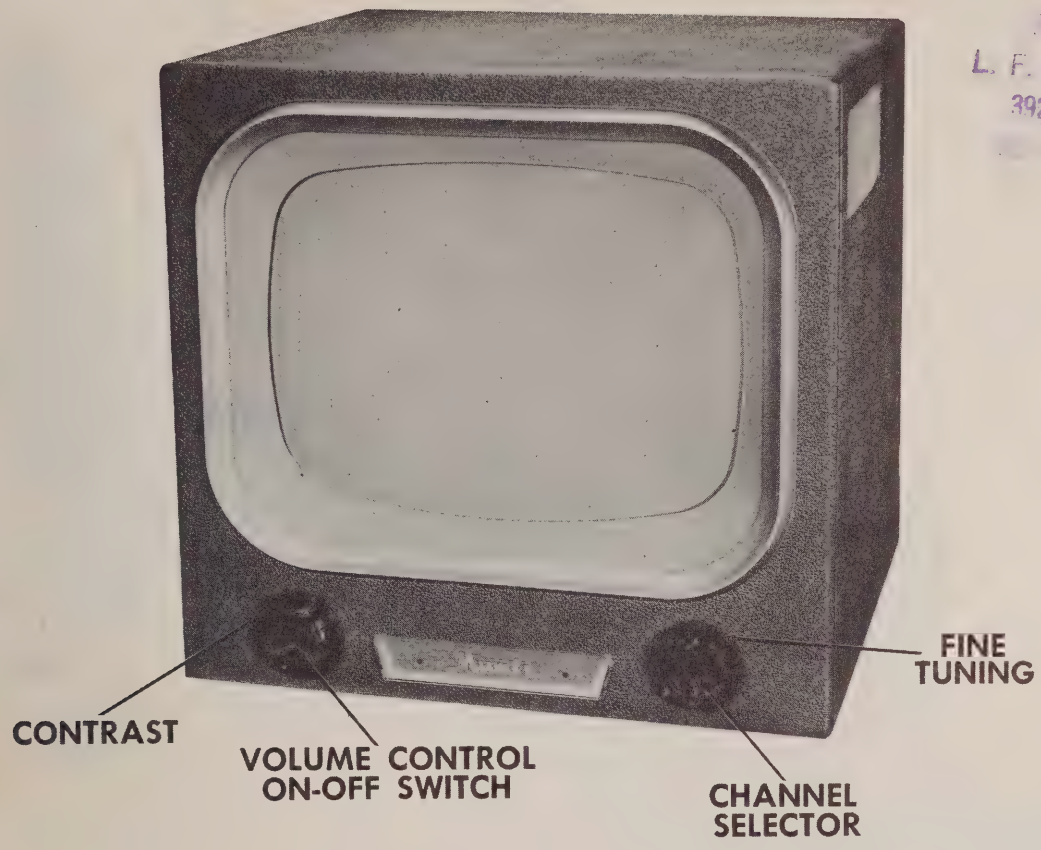

MUNTZ MODEL 2055

TRADE NAME	Muntz Models 2055, A, AU, B, 2066, 2158A, 2159A, 2162A (Ch. 17B2 or 17B6)
MANUFACTURER	Muntz TV Inc., 1735 W. Belmont Ave., Chicago 13, Ill.
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC - 60 Cycle RATING 1.6 Amp. @ 117 Volts AC
TUNING RANGE–	Channels 2 thru 13, Video IF 25.1MC, Sound IF 20.6MC (Intercarrier)

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MUNTZ
MODELS 2055, A, AU, B,
2066, 2158A, 2159A, 2162A

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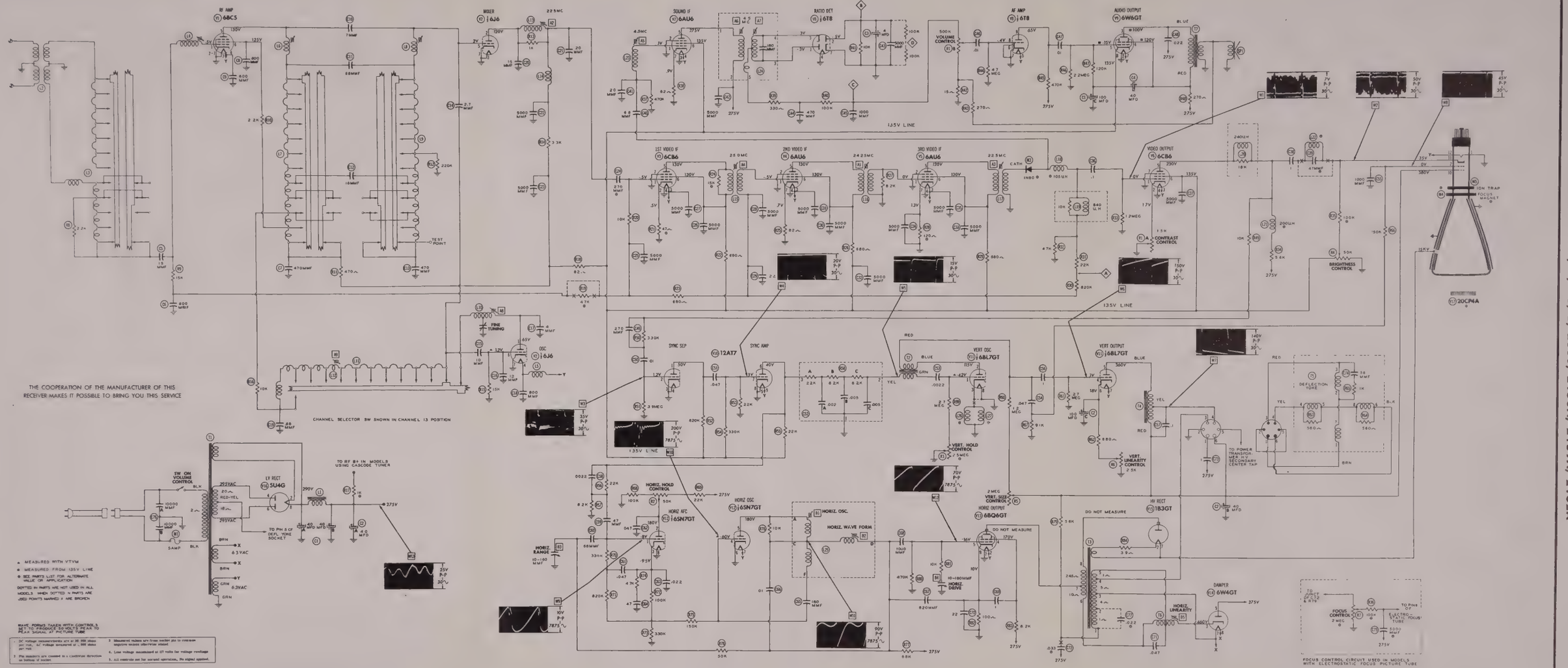
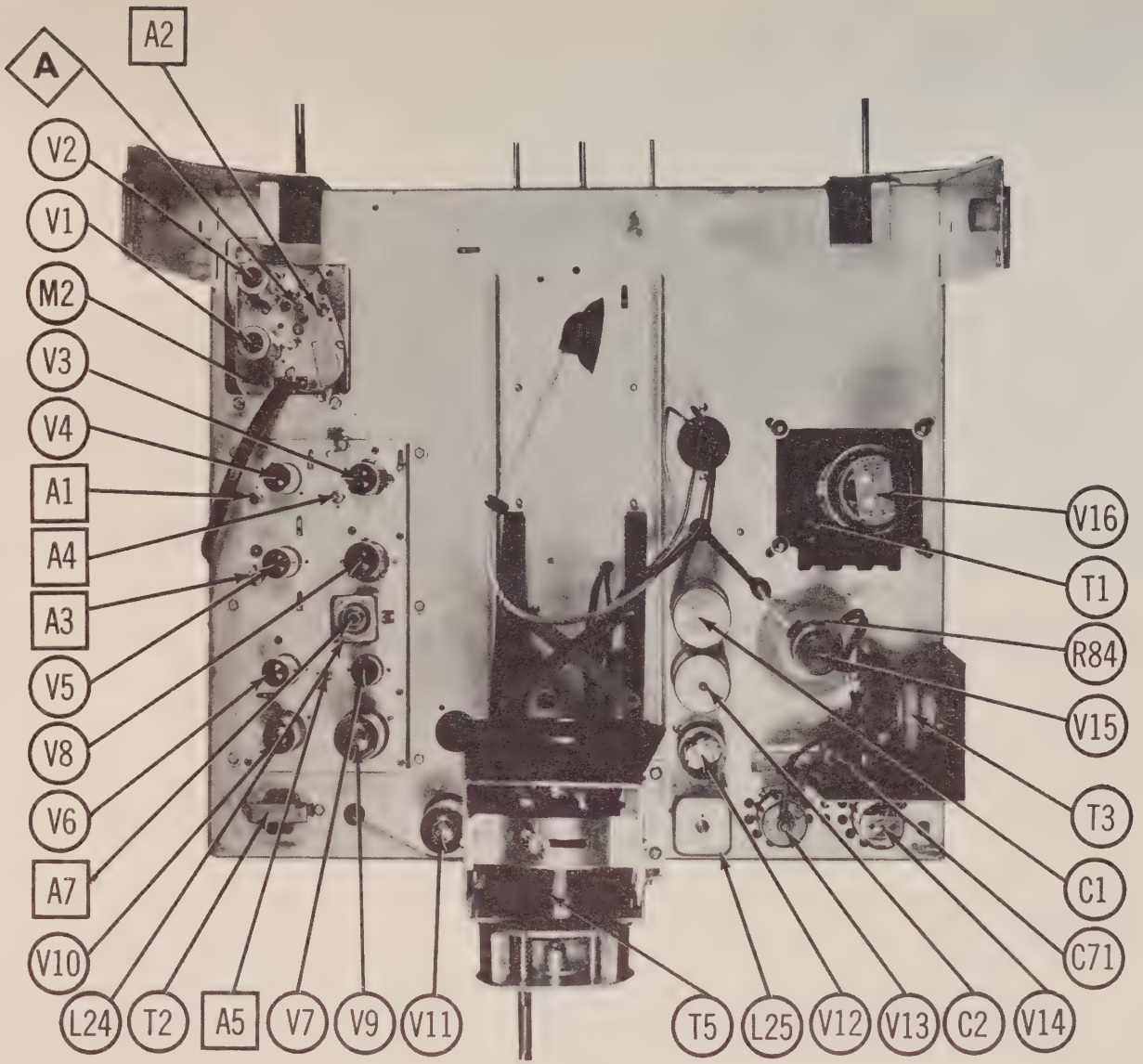

MUNTZ
MODELS 2055, A, AU, B, 2066, 2158A, 2159A, 2162A
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTOR SW SHOWN IN CHANNEL 13 POSITION
135V LINE
TEST POINT
TO RF B+ IN MODELS USING CASCODE TUNER
TO PIN 5 OF DEFL. YOKE SOCKET
TO POWER TRANSFORMER H.V. SECONDARY CENTER TAP
DO NOT MEASURE
HORIZ. OSC.
HORIZ. WAVE FORM
FOCUS CONTROL CIRCUIT USED IN MODELS WITH ELECTROSTATIC FOCUS PICTURE TUBE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1953
MUNTZ
MODELS 2055, A, AU, B, 2066, 2158A, 2159A, 2162A



CHASSIS TOP VIEW

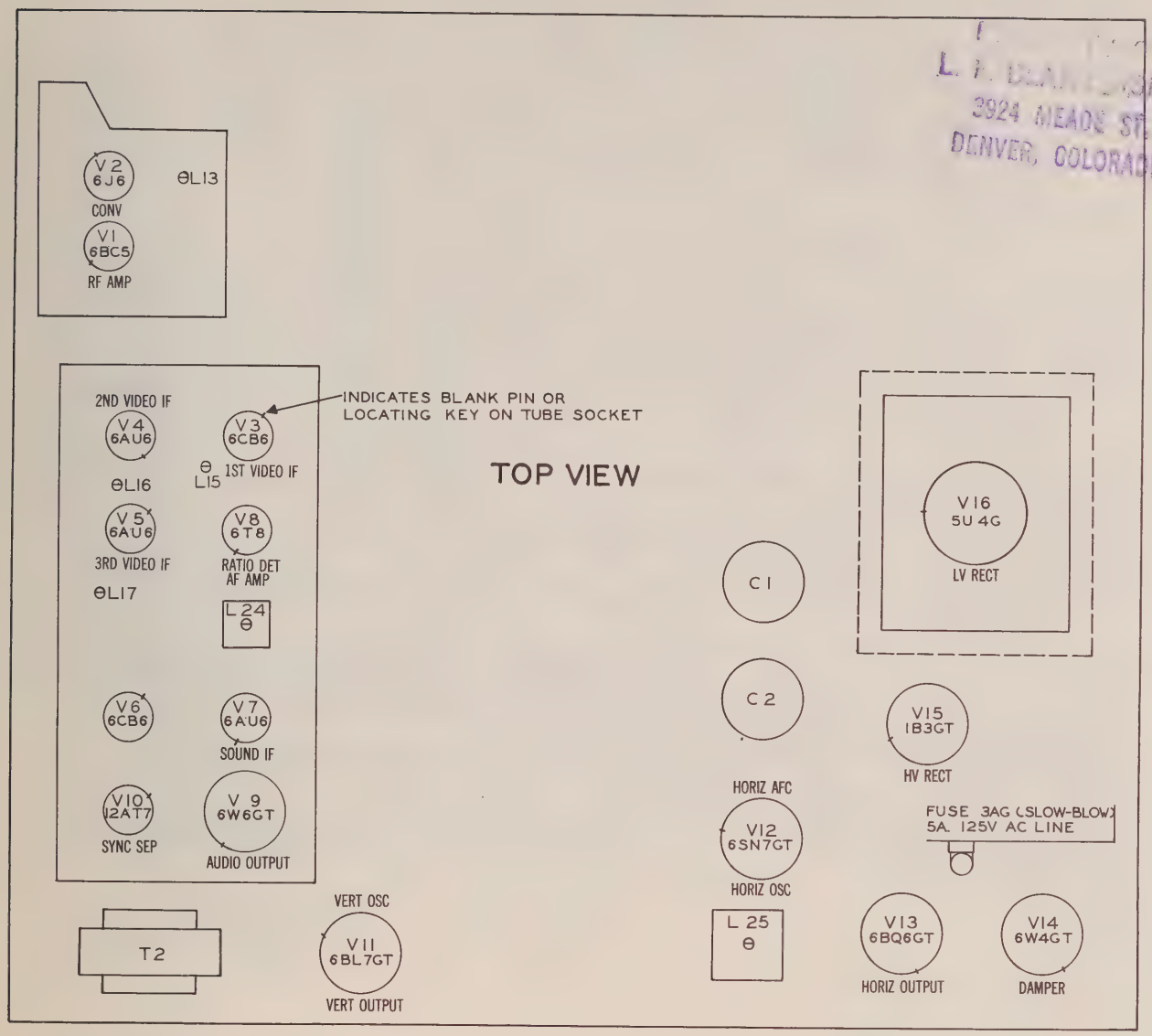
CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

MUNTZ

MODELS 2055, A, AU, B, 2066, 2158A, 2159A, 2162A

L. F. BLA
3924 MENDE ST.
DENVER, COLORADO

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V16, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V9
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V17
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V10, V11
No horiz. sync - V10, V12
No vert. or horiz. sync - V10

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V17
No vert. deflection - V11
Poor vert. linearity or foldover - V11
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, V15, V16
Vert. off freq. - V10, V11
Horiz. off freq. - V10, V12

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube, V12.

VIDEO IF ALIGNMENT

Remove the converter tube, V2, from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Turn slugs all the way down before aligning. Use only enough signal to obtain a usable indication on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24.25MC (Unmod.)	Any	DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	22.5MC	"	"	A2, A3	"
3.	"	"	25.0MC	"	"	A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	20.6MC 22.6MC 24.3MC 25.1MC	Any	Vert. Amp. to point (A). Low side to chassis.		Check for response as in Fig. 1. If necessary retouch A1 thru A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.
Turn contrast control all the way counter clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to junction of video detector crystal and C40. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common to chassis.	A5, A6	Adjust for maximum deflection.
6.	"	"	"	"	DC probe to point (C). Common to point (D).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Turn contrast control all the way counter clockwise.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to junction of video detector crystal and C40. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A5 A6	Disconnect stabilizer capacitor C3. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
6.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A7	Reconnect capacitor C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

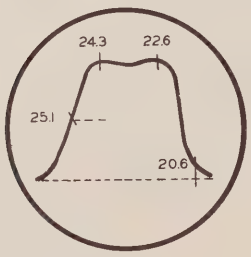


FIG.1

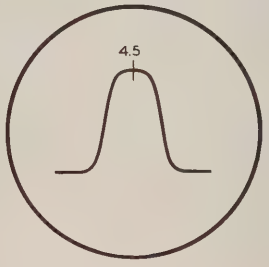


FIG. 2

ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.

PROPERTY OF
L. F. PLANNENO

TUNER NUMBERS PR-0195-1-2

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control at the center of its range. (Note: Fine tuning control is not used in tuner #PR-0195).
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft . The correct screw is accessible through this hole as the channel switch is turned to each channel.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75 MC	13	Vert. Amp. to point ⟨B⟩ . Low side to chassis.	A8	Adjust to place video marker at 50% on high frequency slope of IF response curve as in Fig. 4.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A9	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A10	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A11	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A12	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A13	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A14	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A15	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A16	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A17	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A18	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A19	

TUNER NUMBER PR-0194

It is recommended that oscillator alignment be made using TV signals, preferably test patterns, of stations operating within the range of the receiver.
If the majority of channels are off frequency approximately the same amount and same direction it may be possible to correct them in one step by adjusting A8, the oscillator padder.
Tune in the highest station within range and adjust A8 until sound bars just appear in the picture, then back off the adjustment until the sound bars disappear and picture definition is at its best.
Any individual channel that is off frequency can then be corrected by adjusting the individual oscillator adjustment screws A9 thru A19 in same manner as above. The highest channel should be aligned first, then the others in descending order. If any channel is realigned, all channels of lower frequency should be checked and realigned if necessary.

THE RF PORTION OF THIS TUNER HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT OF THIS PORTION SHOULD NOT BE REQUIRED IN THE FIELD.

TUNER NUMBER PR-0202-1-2

Set the fine tuning control to the mid-position of its range.
Turn channel selector to highest channel of channels 7 to 13, operating within range of receiver.
Adjust A8 for clearest picture with best definition and sound.
Turn channel selector to highest channel of channels 2 thru 6 operating within range of receiver. Adjust A9 for clearest picture with best definition and sound.

THE RF PORTION OF THIS TUNER HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT OF THIS PORTION SHOULD NOT BE REQUIRED IN THE FIELD.

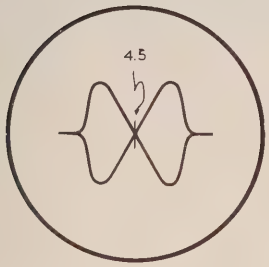


FIG. 3

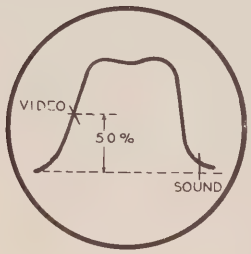
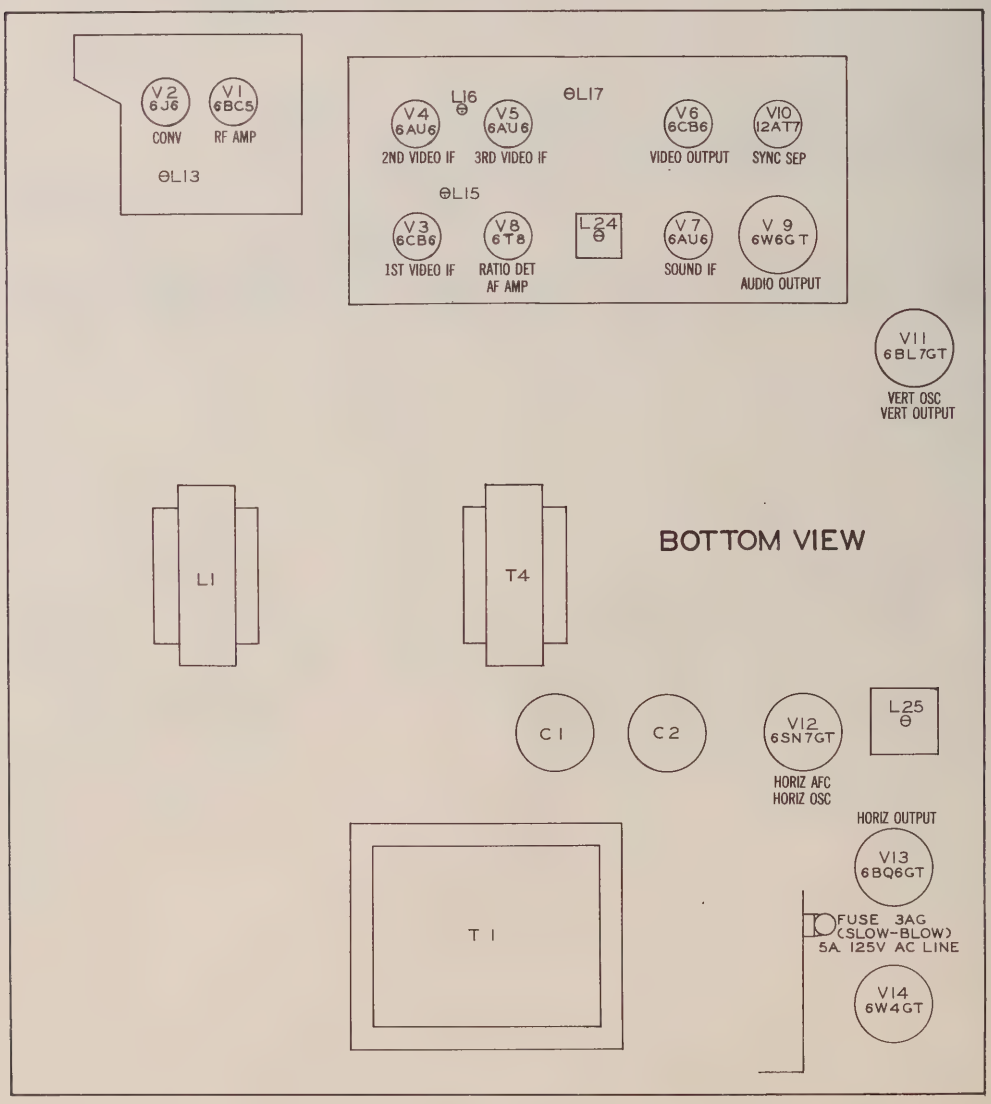


FIG. 4

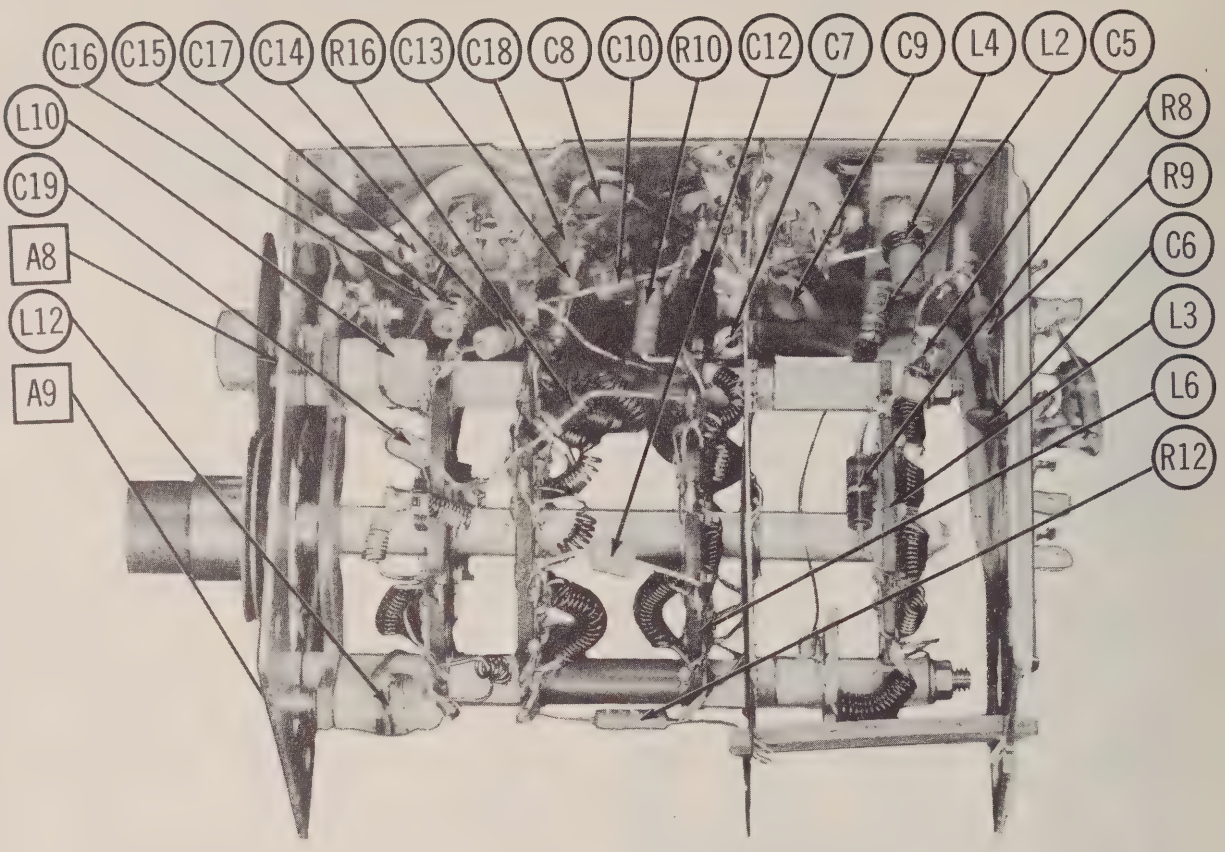
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	900KΩ	0Ω	0Ω	.1Ω	‡550Ω	‡2.8KΩ	0Ω		
V 2	6J6	‡10.6KΩ	‡3.4KΩ	0Ω	.1Ω	220KΩ	15KΩ	0Ω		
V 3	6CB6	850KΩ	47Ω	.1Ω	0Ω	‡680Ω	‡680Ω	0Ω		
V 4	6AU6	850KΩ	0Ω	.1Ω	0Ω	‡680Ω	‡680Ω	82Ω		
V 5	6AU6	.2Ω	0Ω	.1Ω	0Ω	‡680Ω	‡680Ω	120Ω		
V 6	6CB6	1.2Meg	230Ω	.1Ω	0Ω	†5.7KΩ	‡0Ω	0Ω		
V 7	6AU6	470KΩ	0Ω	0Ω	.1Ω	†92Ω	‡0Ω	82Ω		
V 8	6T8	600KΩ	10KΩ	600KΩ	0Ω	.1Ω	0Ω	0Ω	4.7Meg	†470KΩ
V 9	6W6GT	INF	0Ω	†670Ω	†360Ω	†160KΩ	†92Ω	.1Ω	45KΩ	
V 10	12AT7	‡820KΩ	3.9Meg	0Ω	0Ω	0Ω	‡22KΩ	20KΩ	0Ω	.1Ω
V 11	6BL7GT	3.5Meg	♦2.6Meg	.4Ω	2.7Meg	♦6.7KΩ	1.2KΩ	.1Ω	.1Ω	
V 12	6SN7GT	1.5Meg	†25KΩ	430KΩ	480KΩ	†68KΩ	0Ω	.1Ω	0Ω	
V 13	6BQ6GT	INF	.1Ω	INF	†8.3KΩ	470KΩ	†68KΩ	0Ω	100Ω	TOP CAP ♦15Ω
V 14	6W4GT	INF	INF	13Meg	INF	†92Ω	INF	♦7Ω	♦7Ω	
V 15	1B3GT	PINS	1 - 8	HAVE	INF	RESISTANCE				TOP CAP ♦260Ω
V 16	5U4G	INF	60KΩ	INF	19.5Ω	INF	17.8Ω	INF	60KΩ	
V 17	20CP4A	0Ω	150KΩ	PIN 10 ♦5.6KΩ	PIN 11 100KΩ	PIN 12 .1Ω				

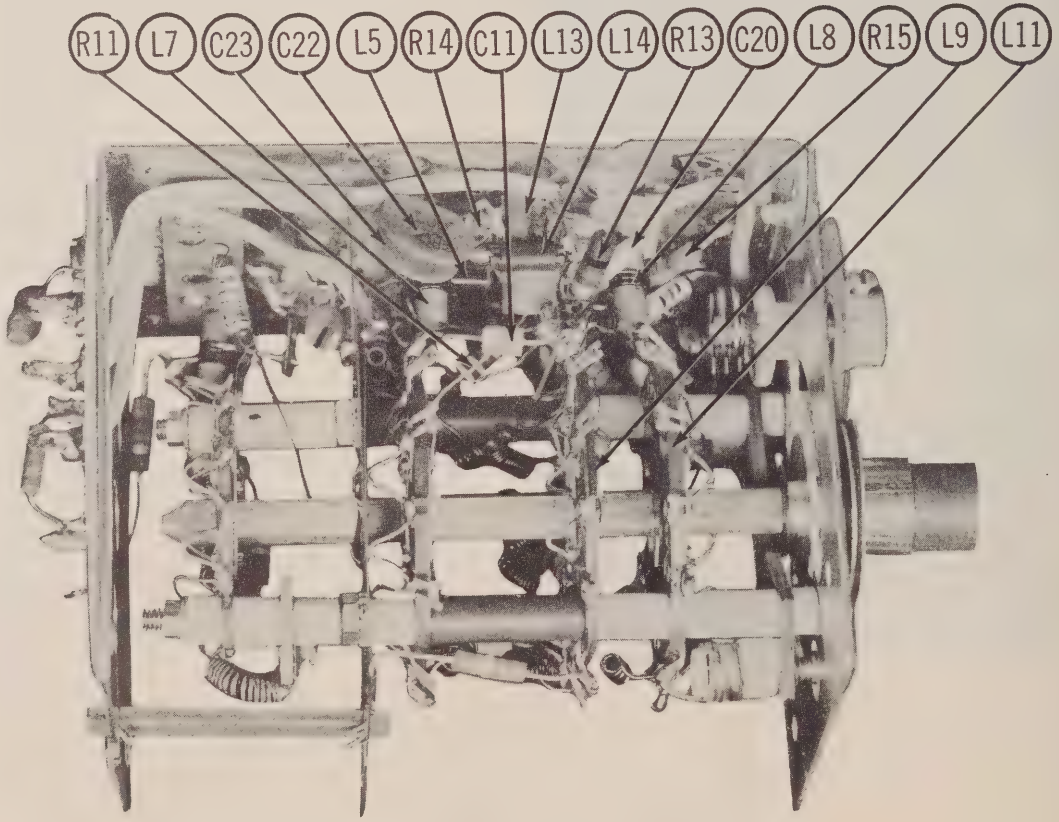
† MEASURED FROM PIN 8 OF V16
♦ MEASURED FROM PIN 3 OF V14
‡ MEASURED FROM 135 VOLT LINE



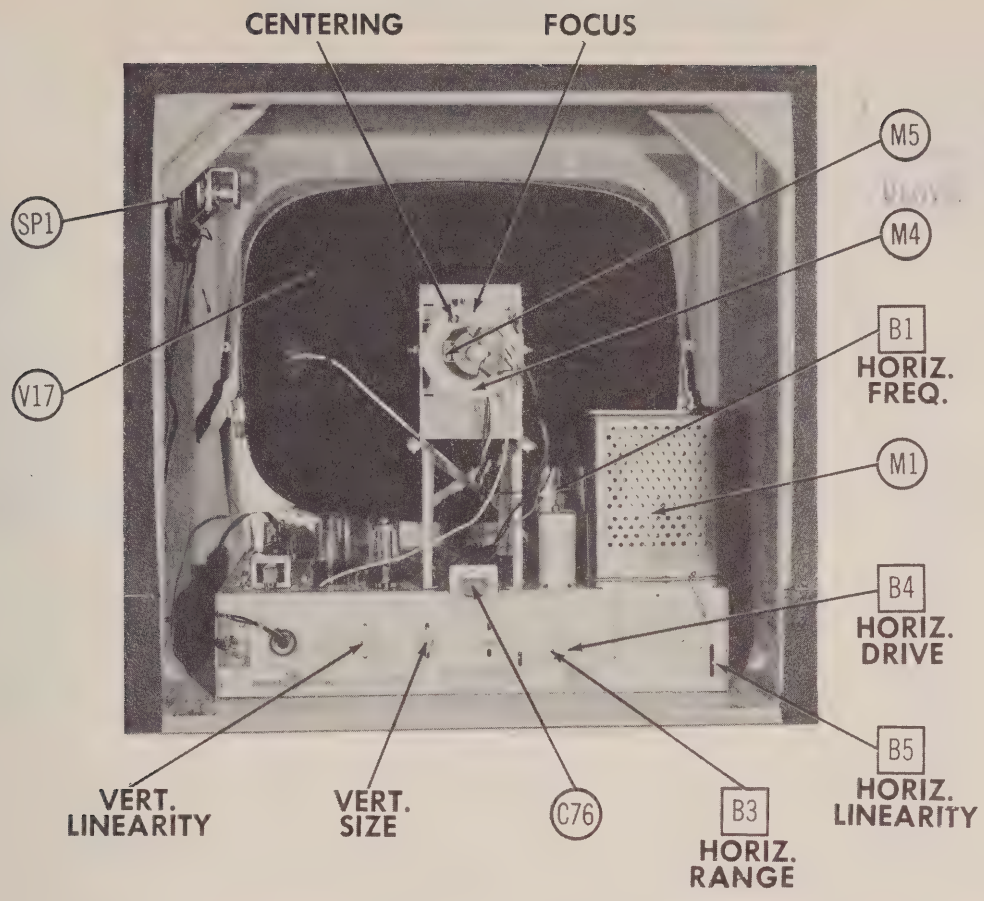
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Preset horizontal oscillator slug (B1) and horizontal waveform slug (B2) in maximum counter clockwise direction.

Short terminals C and D of L25 horizontal oscillator coil with a jumper wire.

Preset the horizontal range trimmer (B3) 1/4 turn from fully clockwise.

Turn the horizontal hold control fully clockwise.

Adjust B1 until picture synchronizes, retouching B3 slightly if necessary.

Remove the short from terminals C and D of L25. The picture should remain in sync. If it does not, re-adjust B3 or B1 to sync the picture.

Connect an oscilloscope throught a 10MMF capacitor to terminal C on L25. Connect the low side to chassis.

Adjust B2 for a waveform as in Fig. 5 with the broad and narrow peaks of equal height. Remove the scope.

Set the horizontal hold control to fully clockwise position. Adjust B1 for one vertical blanking bar. Rotate the horizontal hold control fully counter clockwise. Picture should remain in sync.

Adjust the horizontal drive trimmer (B4) counter clockwise as far as possible, without the presence of vertical white lines or compression of the center of the picture. (Note: If B4 is adjusted the ion trap setting should be checked).

Adjust the horizontal linearity slug (B5) for a picture that is symmetrical from left to right.

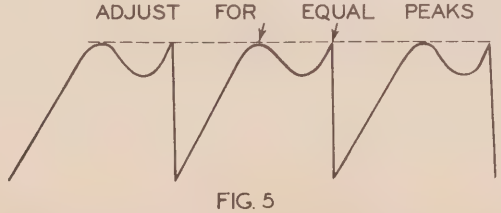


FIG. 5

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Substitute V12, V13 and V14. Check T3 and horizontal deflection yoke.

INSUFFICIENT SWEEP

Substitute V12, V13 and V14. Check waveform at W12.

If Satisfactory	If Unsatisfactory
Check C71, C72 and C73. Check T3, T6 and other components associated with V13 and V14.	Check C66, C67 and C68. Check other components associated with V12 and V13.

DRIVE LINES

Substitute V13 and V14. Check adjustment of B4 and B5. Check C71, C72 and C73. Check T3 and T6.

COMPRESSED LEFT SIDE

Substitute V12, V13 and V14. Check setting of B4 and B5. Check T3 and T6.

FOLDS

Substitute V13 and V14 . Check C69, C71, C72, C73, T3 and other components associated with the horizontal output stage.

XMAS TREE EFFECT

Substitute V12. Check C65, C66, C67, C68 and L25.

VERTICAL

LOSS OF SWEEP

Substitute V11. Check T2, T4, C56, C57 and yoke. Check other components associated with vertical oscillator and output stages.

INSUFFICIENT SWEEP

Substitute V11. Check C2B, C2C and R79. Check T2, T4, C56, C57, yoke and other associated components.

COMPRESSED AT BOTTOM

Substitute V11. Check C2C, T4, yoke and other associated components.

COMPRESSED AT TOP

Substitute V11. Check C2C, C2B, C53, C56 and associated components.

FOLDS

Substitute V11. Check C2B, T2, T4, yoke and associated components.

SYNC

HORIZONTAL

LOSS OF SYNC

Substitute V12. Check C58, C59, C60 and other components associated with V12A.

CRITICAL SYNC

Substitute V12. Check C58, C59, C60, C62, C65, C66, L25 and other components associated with V12.

PULLING PICTURE

Substitute V12. Check C61, C63 and C64. Check L25 and other associated components.

VERTICAL

LOSS OF SYNC

Substitute V11. Check vertical integrator network. Check C53 and T2.

CRITCIAL SYNC

Substitute V10 and V11. Check video signal at W3 and W4 for signal overload and sync clipping. Check vertical integrator network.

TRIGGERING

Substitute V10 and V11. Check circuits of V10 and V11 for filament lead dress.

VIDEO

SOUND BARS

Check adjustment of local oscillator and A5. Check fixed 4.5MC trap (L22 and C39).

POOR RESOLUTION

Substitute V1, V3, V4 and V5. Check video detector crystal. Check video IF Alignment.
Check components of video IF strip.

POOR CONTRAST

Substitute V6. Check C37. Check video detector crystal. Check picture tube.

SMEAR

Substitute V6. Check L20 for open and R34 for change of value. Check C36 and C38. Check picture tube.

ONE WIDE BLACK BAR ACROSS PICTURE

Check RF Tuner, video IF and Video amplifier stages for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

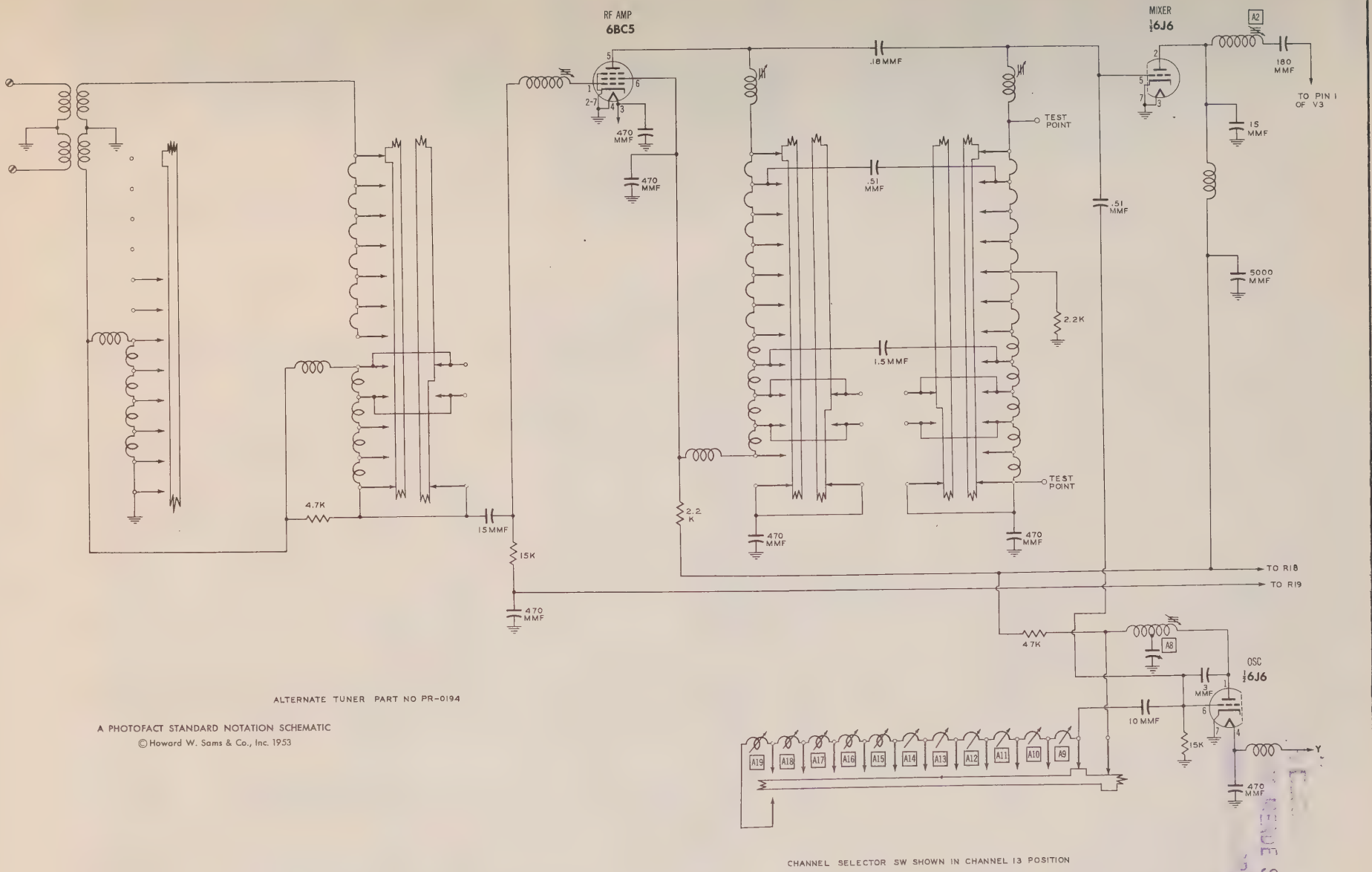
Substitute V7, V8 and V9. Check sound IF and ratio detector alignment. Check circuit components.

BUZZ

Check adjustment of ratio detector secondary (A7).
If buzz is still objectionable, substitute V8 and readjust A7.

DISTORTED

Check sound IF and ratio detector alignment. Check audio amplifier and output stages using audio signal generator.



ALTERNATE TUNER PART NO PR-0194

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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CHANNEL SELECTOR SW SHOWN IN CHANNEL 13 POSITION

ALTERNATE TUNER SCHEMATIC (SARKES TARZIAN PR-0194)

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MUNTZ PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1	RF Amplifier	6BC5	6BC5	7BD	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6AU6	6AU6	7BK	
V5	3rd. Video IF Amp.	6AU6	6AU6	7BK	
V6	Video Output	6CB6	6CB6	7CM	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Detector-AF Amplifier	6T8	6T8	9K	
V9	Audio Output	6W6GT	6W6GT	7S	
V10	Sync Separator	12AT7	12AT7	9A	
V11	Vert. Oscillator-Vert. Output	6BL7GT	6BL7GT	8BD	
V12	Horiz.AFC-Horiz. Oscillator	6SN7GT	6SN7GT	8BD	
V13	Horiz. Output	6BQ6GT	6BQ6GT	8AM	
V14	Damper	6W4GT	6W4GT	4CG	
V15	HV Rectifier	1B3GT	1B3GT	3C	
V16	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MUNTZ PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RTMA BASE TYPE	NOTES
V17A	20CP4A	20CP4A	12D	① Circuit changes necessary
		20CP4 ①	12D	② 3/8" Longer
B	20HP4A	20HP4A ①	12C	
		20HP4 ① ②	12C	
		20LP4 ① ②	12C	
C	21EP4A	21EP4A	12D	
		21EP4 ①	12D	
D	21FP4A	21FP4A	12C	
		21FP4 ①	12C	
E	24AP4		12D	
F	24BP4		12C	
		20DP4 ① ②	12D	
		20DP4A ①	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MUNTZ PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	±40	450	CE-0026	AFH3-159		C1I8		FP375	TVL-3764	
B	±40	450								
C	±100	200								
C2A	±40	450	CE-0033	AFH3-142		C109		FP375	TVL-3764	
B	±40	450								
C	±100	50								
C3	4	50	CE-0031	PRS150/4		BR550	TC30	TC525	TVA-1303	
C4	40	250	CE-0034	PRS250/40		BR4025A	TC50	TC526	TVA-1511	
C5	15									
C6	800			BPD-0008	DD-801		801-001	DC-521	5GA-T8	
C7	470			SI470	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C8	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5GA-T8	
C9	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5GA-T8	
C10	.7									
C11	.68									
C12	.18									
C13	470			SI470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C14	2.7									
C15	10			SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C16	12				TCZ-12		NP0K-120			
C17	4									
C18	800			BPD-0008	DD-801	TM5T8	801-001	DC-521	5GA-T8	
C19	.68									
C20	15									
C21	20			SI20NP0	TCZ-20		NP0K-200	Z7-542	5TCC-Q2	
C22	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C23	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C24	270			SI270	D6-271		GP2K-271	UC-5327	5GA-T27	Note 1
C25	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C26	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C27	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C28	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C29	.22	200	CP-0055	P488-22		PTE4P22		PT4025	3TM-P22	
C30	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C31	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C32	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C33	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C34	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C35	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C36	.1	400	CP-0034	P488-1	DF-104		PTE4P1	PT401	4TM-P1	
C37	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C38	.1	600	CP-0013	P688-1	DF-104		PTE6P1	PT601	6TM-P1	
C39	47			SI47NT50	TCN-47		N750K-470	NT-5447	5TCU-Q47	Note 3
C40	6.8			SI6.8NP0	TCZ-6.8		NP0K-6R8	Z7-5568	5TCCB-V68	
C41	20			SI20NP0	TCZ-20		NP0K-200	Z7-542	5TCC-Q2	
C42	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C43	5000		CC-0060	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	
C44	470		CC-0078	SI470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C45	1000		CC-0081	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C46	.01	400	CP-0041	P488-01	D6-103		PTE4S1	GP2-333-103	PT411	4TM-S1
C47	.01	400	CP-0041	P488-01	D6-103		PTE4S1	GP2-333-103	PT411	4TM-S1
C48	.022	600	CPM-0102	P688-022			PTE6S22		PT6122	6TM-S22
C49	270		CC-0084	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MUNTZ PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C50	.01	600	CPM-0101	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C51	.047	400	CPM-0105	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C52A	.002			P688-002		PTE6D2		PT622		
B	.005		*CC-0071	P688-005	*EPC-100	PTE6D5	*E1405-01	PT625	*E101C1	
C	.005			P688-005		PTE6D5		PT625		
C53	.0022	600	CPM-0100	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C54	.047	600	CP-0049	P688-047		PTE6S47		PT6147	6TM-S47	
C55	1000		CC-0081	SI1000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C56	.1	600	CP-0013	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C57	.1	400	CP-0034	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C58	.0022	600	CPM-0095	P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	
C59	47	500	CM-0044	1469-00006	TCZ-47	SR5Q5	NP0L-470	MC3225	MS-45	
C60	68	1000	CM-0047					MCL468	10GA-Q68	
C61	.047	600	CPM-0105	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C62	.047	600	CPM-0104	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C63	.022	200	CP-0052	P488-022		PTE4S22		PT4122	4TM-S22	
C64	.47	200	CP-0045	P288-47		PJ2P5		PT405	2TM-P47	
C65	180		CC-0113							
C66	.01	400	CP-0041	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C67	820	500	CM-0046							
C68	1000	1000	CC-0112	HVD15-001				MCK210	10GA-D1	
C69	.1	600	CP-0013	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C70	.22	200	CPM-0100	P488-22		PTE4P22		PT4025	2TM-P22	
C71	.047	600	CP-0049	P688-047		PTE6S47		PT6147	6TM-S47	
C72	.033	600	CPM-0103	P688-033				PT6133		
C73	.1	600	CP-0013	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C74	56	2000							20GA-Q56	
C75	5000		CC-0080	BPD-005	MD-502	TM5D5	81L-005	DC-525	5HK-D5	Note 2
C76A	10000		CC-0096	BPD-2K01	DD-S-103	TM5D81	81L-01	DC-511	5HK-281	
B	10000						81L-01	DC-511		
C77	.022	800	CPM-0102							Note 4

Note 1. In some models C24 is included with the tuner.
Note 2. C75 is used only on chassis using electrostatic focus picture tubes.
Note 3. Not used in all Models.
Note 4. Used with 24" picture tubes only.
* Items C52A, C52B, C52C, R58A, R58B, R58C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MUNTZ PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1500Ω	½	VC-0040-B	QJ-20 *	RTV-318	SBB-699-S	UF152L	Contrast-Panel
B	500KΩ	½					UR55A	Volume-Rear
C	Switch						US-26	Attach to R1B
R2A	50KΩ	½	VC-0036	Q1I-123	AG-44-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R2A
R3A	2.5Meg	½	VC-0049	Q1I-239	AG-84-S	AB-83	U-255	Vert. Hold-Note 1
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R3A
R4A	50KΩ	½	VC-0035	Q1I-123	AG-44-S	AB-31	U-35	Brightness
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R4A
R5A	2Meg	½	VC-0034F	Q1I-139	AG-83-S	AB-75	SU-56	Vert. Size
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R5A
R6A	2500Ω	½	VC-0037	Q1I-112	AG-15-S	AB-7	U-8	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R6A
R7	2Meg							Focus-Note 2

Note 1. Chassis with serial no. between 255625 and 369500 use a 2Meg control in this application.
Note 2. Used only with electrostatic focus picture tubes.
* CONCENTRIKIT EQUIVALENT - KIT K-2, BASE ELEMENTS & SHAFTS B1Y-110 & P1-126 (Panel)
B1B-133 & R2-216 (Rear) & Switch T6-1.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MUNTZ PART No.	IRC PART No.	NOTES
R8	2200Ω	½		BTS-2200	
R9	15KΩ	½		BTS-15K	
R10	2200Ω	½		BTS-2200	
R11	470Ω	½		BTS-470	
R12	220KΩ	½		BTS-220K	
R13	1000Ω	½		BTS-1000	
R14	3300Ω	½		BTS-3300	
R15	15KΩ	½		BTS-15K	
R16	10KΩ	½			
R17	2000Ω	½	RC-1001-18	BTS-1000	Note 1
R18	82Ω	½	RC-082-18	BTS-82	
R19	4700Ω	½		BTS-4700	Note 2
R20	10KΩ	½	RC-1002-18		
R21	47Ω	½	RC-047-18	BTS-47	Note 3
R22	680Ω	½	RC-680-18	BTS-680	
R23	680Ω	½	RC-680-18	BTS-680	
R24	15KΩ	½	RC-1502-18		Note 4
R25	82Ω	½	RC-082-18	BTS-82	
R26	680Ω	½	RC-680-18	BTS-680	
R27	8200Ω	½	RC-8201-18		
R28	120Ω	½	RC-120-18	BTS-120	Note 3
R29	680Ω	½	RC-680-18	BTS-680	
R30	820KΩ	½	RC-8203-18	BTS-820K	
R31	22KΩ	½	RC-2202-18	BTS-22K	
R32	4700Ω	½	RC-4701-18	BTS-4700	
R33	1.2Meg	½	RC-1204-18	BTS-1.2Meg	
R34	5600Ω	2	RC-5601-12	BTS-5600	
R35	100KΩ	½	RC-1003-18	BTS-100K	Note 5
R36	100KΩ	½	RC-1003-18	BTS-100K	Note 6
R37	470KΩ	½	RC-4703-18		
R38	82Ω	½	RC-082-18	BTS-82	
R39	330Ω	½	RC-330-28	BTS-330	
R40	100KΩ	½	RC-1003-18	BTS-100K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MUNTZ PART No.	IRC PART No.	NOTES
R41	10KΩ	½	RC-1002-18	BTS-10K	
R42	15Ω	½	RC-015-28	BTS-15	
R43	270Ω	½	RC-270-18	BTS-270	
R44	4.7Meg	½	RC-4704-28	BTS-4.7Meg	
R45	470KΩ	½	RC-4703-18	BTS-470K	
R46	2.2Meg 5%	½	RC-2204-58	BTS-2.2Meg 5%	
R47	120KΩ 5%	½	RC-1203-58	BTS-120K 5%	
R48	270Ω	2	RC-270-12		
R49	10KΩ	½	RC-1002-18	BTS-10K	
R50	330KΩ	½	RC-3303-18	BTS-330K	
R51	3.9Meg	½	RC-3904-18	BTS-3.9Meg	
R52	820KΩ	½	RC-8203-18	BTS-820K	
R53	22KΩ	½	RC-2202-18	BTS-22K	
R54	330KΩ	½	RC-3303-18	BTS-330K	
R55	22KΩ	½	RC-2202-18	BTS-22K	
R56	22KΩ	½	RC-2202-18	BTS-22K	
R57	8200Ω	½	RC-8201-18	BTS-8200	
R58A	22KΩ	½		BTS-22K	
B	8200Ω	½	*CC-0071	BTS-8200	
C	8200Ω	½		BTS-8200	
R59	2.7Meg	½	RC-2704-18	BTS-2.7Meg	
R60	1.2Meg	½	RC-1204-18	BTS-1.2Meg	
R61	2.7Meg	½	RC-2704-18	BTS-2.7Meg	
R62	68Ω	½	RC-680-18	BTS-680	
R63	560Ω	½		BTS-560	
R64	560Ω	½		BTS-560	
R65	1000Ω	½		BTS-1000	
R66	150KΩ	½	RC-1503-18	BTS-150K	
R67	9100Ω 5%	½	RC-9101-58	BTS-9100 5%	
R68	100KΩ	½	RC-1003-18	BTS-100K	
R69	22KΩ	½	RC-2202-18	BTS-22K	
R70	330KΩ	½	RC-3303-18	BTS-330K	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MUNTZ PART No.	IRC PART No.	NOTES
R71	820KΩ	½	RC-8203-18	BTS-820K	
R72	100KΩ	½	RC-1003-18	BTS-100K	
R73	330KΩ	½	RC-3303-18	BTA-330K	
R74	4700Ω	½	RC-4701-18	BTS-4700	
R75	150KΩ	½	RC-1503-18	BTA-150K	
R76	10KΩ	½	RC-1003-18	BTS-10K	
R77	68KΩ	1	RC-6802-11	BTA-68K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MUNTZ PART No.	IRC PART No.	NOTES
R78	150KΩ	1	RC-1503-11	BTA-150K	
R79	5600Ω	2	RC-5601-12	BTB-5600	
R80	470KΩ	½	RC-4703-18	BTS-470K	
R81	10KΩ	½	RC-1002-18	BTS-10K	
R82	100Ω	2	RC-100-12	BW-2-100	
R83	8200Ω	2	RC-8202-12	BTB-8200	
R84	3.9Ω	½	RC-004-18		

Note 1. Used only with cascode tuner.
Note 2. Not used in all Models.
Note 3. Chassis 17B6 with serial no. between 255625 & 361950 use a 82Ω resistor in this application.
Note 4. Chassis 17B6 with serial no. between 255625 & 361950 use a 8200Ω resistor in this application.
Note 5. Chassis 17B6 with serial no. between 255625 & 361950 use a 150KΩ resistor in this application.
Note 6. Used only with electrostatic focus picture tubes .
* Items R58A, R58B, R58C, C52A, C52B, C52C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: MUNTZ PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.
T1	117VAC	585VCT	5VAC	6.3VAC	TP-0020					
	②1.6A	.200ADC	③ 3A	④ 1.2A	TP-0018 ①					
				SEC. 4						
				6.3VAC						
				⑤ 7.5Ω						

① Alternate Transformer

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: MUNTZ PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
T2	210Ω	180Ω	TO-0035-3 ⑧	A-8125	A-3003	TSO-5	A-97X		Vert. Osc. Trans.
T3	256Ω tap	110 tap④	TO-0031	A-8132	HVO-④①	TFB-5①	D-19 ①⑥	225T1 ① ⑦	Horiz. Output Trans.
	④ 10Ω	10, 5Ω,10Ω			②				
		SEC. 2							
		0Ω							
T4	1080Ω tap		TO-0034	A-8123	A-3037	TSO-8 ⑤	A-102X	204T2 ①	Vert. Output Trans.
	④ 13Ω								
T5A	18Ω		LC-0060	DY-9A⑨	MDF-70	TY-5	Y-17	21HD2	Horiz. Deflection Coils
B	5Ω		LC-0058 ⑦						Vert. Deflection Coils
			LC-0058-1 ⑩						
			LC-0058-2 ⑪						
T6	.5Ω tap		LR-0034			TC-3		209R1	Horiz. Lin. Coil
	④1.5Ω								

① Drill new mounting holes.
② Connect linearity coil and condenser in plate circuit of 6W4
③ Use with width coil TW1-1
④ Connect original terminal #7 to terminal 9, original #6 to #8, #5 to #7, #4 to #5, #3 to #4 and #1 to #3.
Terminal 1 and "T" Not used on replacement unit.
⑤ Connect as auto trans.
⑥ Use original horiz. deflection coil network if necessary
⑦ See instruction sheet packed with unit for terminal connections.
⑧ Alternate Vert. Osc. Trans. part # is TO-0035.
⑨ Used in Ch. 17B1 and 17B2
⑩ Used in Ch. 17B3 and 17B4
⑪ Used in Ch. 17B5 and 17B6

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MUNTZ PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T7	2.8KΩ	3.45Ω	310Ω	1.08Ω	TO-0033	A-3825 ①	A-3018	RO-304 ①	S-4X ①	① Drill one new mounting hole

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: MUNTZ PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	5"	PM	3.45 Ω	SK-0019	ST-105	5A07	① 10" PM speaker used in Models 2156A and 2159A
				SK-0020 ①	Mod. P5-X		

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D C. RESISTANCE	RATINGS: INDUCTANCE (D CURRENT 1000 Ma.)	REPLACEMENT DATA: MUNTZ PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.200ADC	92Ω	2.8 Hy.	LC-0059-1	C-2325 ①	C-2974	TR-3300 ①	

① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MUNTZ PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L2	Ant. Trans.	0Ω CT	0Ω					Low channel secondary-0Ω
L3	Ant. Coils	0Ω						Channel 13
L4	Ant. Coil	0Ω						
L5	Fil. Choke	0Ω						Channel 13
L6	RF Coil	0Ω						
L7	RF Coils	0Ω						
L8	Mixer Grid Coil	0Ω						Channel 13
L9	Mixer Grid Coils	0Ω						
L10	Osc. Plate Coil	0Ω CT						Channel 13
L11	Osc. Coils	0Ω						Channel 6
L12	Osc. Coil	0Ω						
L13	1st. Video IF	.1Ω						
L14	RF Choke	.1Ω						
L15	2nd. Video IF	.2Ω	.2Ω	LI-0042				
L16	3rd. Video IF	.2Ω	.2Ω	LI-0041				
L17	4th. Video IF	.2Ω	.2Ω	LI-0040				
L18	Series Peaking Coil	6.3Ω		LC-0057-2	4642	19-3093		105 Microhenries, Note 2
L19	Shunt Peaking Coil	18Ω		LC-0057-3	4650 *	19-3660 *		640 Microhenries, wound on 10KΩ resistor, Note 2
L20	Series Peaking Coil	10Ω		LC-0057-4	4646 †	19-3250 †		240 Microhenries, wound on 18KΩ resistor, Note 3
L21	Shunt Peaking Coil	9Ω		LC-0057-5	6180	19-3180		200 Microhenries, Note 4
L22	4.5MC Trap	2.2Ω		LC-0062	1470 ■	20-1004 ■		Not used in all Models.
L23	Sound IF	4.8Ω		LO-0038-1	1469	17-3400		
L24	Ratio Det.	4Ω	.4Ω CT	LI-0046	1468 ▲	17-1033 ▲		Tertiary Winding -.8Ω
L25	Horiz. Osc.	75Ω		LO-0039	6183	20-1402		Pri. tapped ⓐ 55Ω, horiz. waveform winding - 42Ω
L26	Fil. Choke	.8Ω			4602	19-3001	CLA	1 Microhenry, not used on all Models.
L27	Fil. Choke	.8Ω			4602	19-3001	CLA	1 Microhenry, not used on all Models.

Note 1. Some Models use 170 microhenries series peaking coil, wound on 39KΩ resistor in this application.
Note 2. Some Models use 170 microhenries shunt peaking coil wound on 39KΩ resistor in this application.
Note 3. Some Models use 400 microhenries series peaking coil wound on 22KΩ resistor in this application.
Note 4. Some Models use 280 microhenries shunt peaking coil wound on 22KΩ resistor in this application.
■ Drill mounting hole.
▲ Drill mounting holes.
* Parallel with 10KΩ resistor
† Parallel with 18KΩ resistor

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA MUNTZ PART No. FUSE	MUNTZ PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG (Slo-Blo)	5A ⓐ 125V			313005	357001	MDX-5	4405

MISCELLANEOUS

ITEM No.	PART NAME	MUNTZ PART No.	NOTES
M2A	RF Tuner	PR-0202-1-2	
B	RF Tuner	PR-0195-1-2	
C	RF Tuner	PR-0195	
D	RF Tuner	PR-0194	
M3A	Crystal Diode	CX-0028	Video Detector
B	Crystal Diode	CX-0030	Video Detector
M4	Focus Magnet	PR-0185	Used with Chassis using magnetic focusing picture tube
M5	Ion Trap	PR-0172	
B3, B4	Trimmer Capacitors	CT-0012	Horiz. Drive, Horiz. Range Dual 10-160MMF
	Cabinet	CW-0037-5	Table Model 2055B
	Cabinet	CW-0040-1	Table Model 2162A - Walnut
	Cabinet	CW-0040-3	Table Model 2162A- Mahogany
	Cabinet	CW-0040-4	Table Model 2162A - Blonde
	Cabinet	CW-0045	Table Model 2166 - Masonite
	Cabinet Back	BP-0134	Model 2162-A
	Cabinet Back	BP-0136	Model 2158-A, 2159-A
	Cabinet Back	BP-0137	Model 2162-A
	Cabinet Back	BP-0139	Model 2066
	Bezel	ES-0039	Model 2162-A for 21" Rect. picture tube
	Mask-metal	ES-0040	Model 2162-A for 21" Rect. picture tube
	Mask-plastic	ES-0041	Model 2159-A, 2162-A for 21" Rect. picture tube
	Safety glass	WG-0014	Model 2162-A
	Knob	KB-0032	Volume control Models 2055-B, 2158-A, 2159A, 2162A
	Knob	KB-0036	Channel Selector Models 2055-B, 2158-A, 2159A, And 2162A
	Knob	KB-0037	Fine Tuning Models 2055-B, 2158-A, 2159-A, 2162-A
	Knob	KB-0038	Contrast, Models 2055-B, 2158-A, 2159-A, 2162-A
	Knob	KB-0039	Fine Tuning Model 2066
	Knob	KB-0040	Channel Selector Model 2066
	Knob	KB-0041	Contrast Model 2066 } Specify desired color
	Knob	KB-0042	Volume control Model 2066

TROUBLE SHOOTING AIDS (CONT.)

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HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Substitute V12, V13, V14, V15 and V9. Check waveform at W12.

If Satisfactory	If Unsatisfactory
Check C69, R84, C71, C72, C73, T3 and other components associated with V13, V14 and V15. Check picture tube.	Check B4, C68, C70, C67, C66, L25 and other components associated with V12.

INSUFFICIENT HIGH VOLTAGE

Substitute V12, V13, V14, V15, V9 and V16. Proceed as outlined under LOSS OF HIGH VOLTAGE.

BLOOMING

Substitute V14 and V15. Check R84 and T3. Check picture tube.

POWER

SMALL AND/OR DIM RASTER

Substitute V16 and V9. Check B plus filter network.

WEAK PICTURE, WEAK SOUND

Substitute V16 and V9. Check B plus filter capacitors and network.

GENERAL

RASTER, SOUND, NO PICTURE

Substitute V6. Check components associated with V6. Check picture tube.

INTERMITTANT STREAKS

Check high voltage section for corona discharge and arcing.

TOTAL LOSS OF SYNC

Substitute V10. Check circuit components associated with V10.

POOR FOCUS

Check focalizer unit adjustment. On sets that do not use this unit check adjustment of focus control. Substitute V16 and check picture tube.

SET DEAD

Check Fuse M1. Check AC interlock assembly. Check T1.

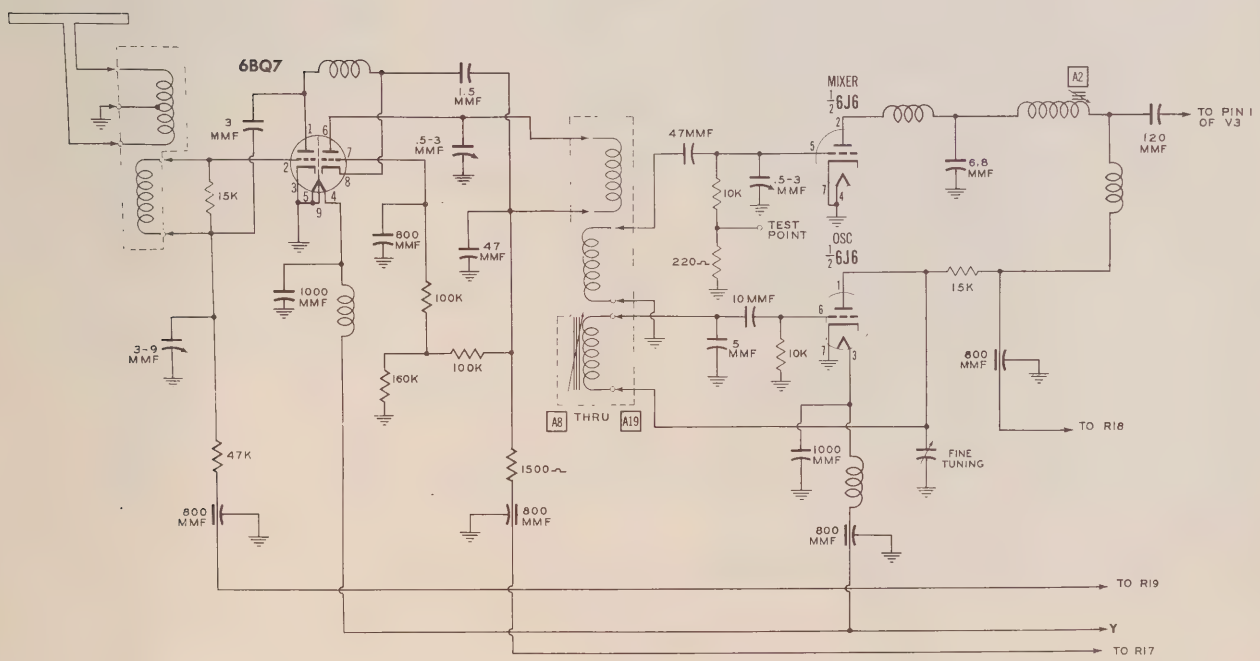
RASTER, NO SOUND, NO PICTURE

Substitute V1, V2, V3, V4, V5 and video detector crystal. Check video IF components and alignment of video IF stages.

RASTER, SNOWY PICTURE, WEAK SOUND (Strong signal areas)

Substitute V1, V3, V4 and V5.

Symptoms shown above are assumed and are not indicative of the quality and workmanship of this receiving equipment.



ALTERNATE TUNER PART NO. PR-0195-1-2

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ALTERNATE TUNER SCHEMATIC (STANDARD COIL PR-0195-1-2)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removing the channel selector and fine tuning knobs.

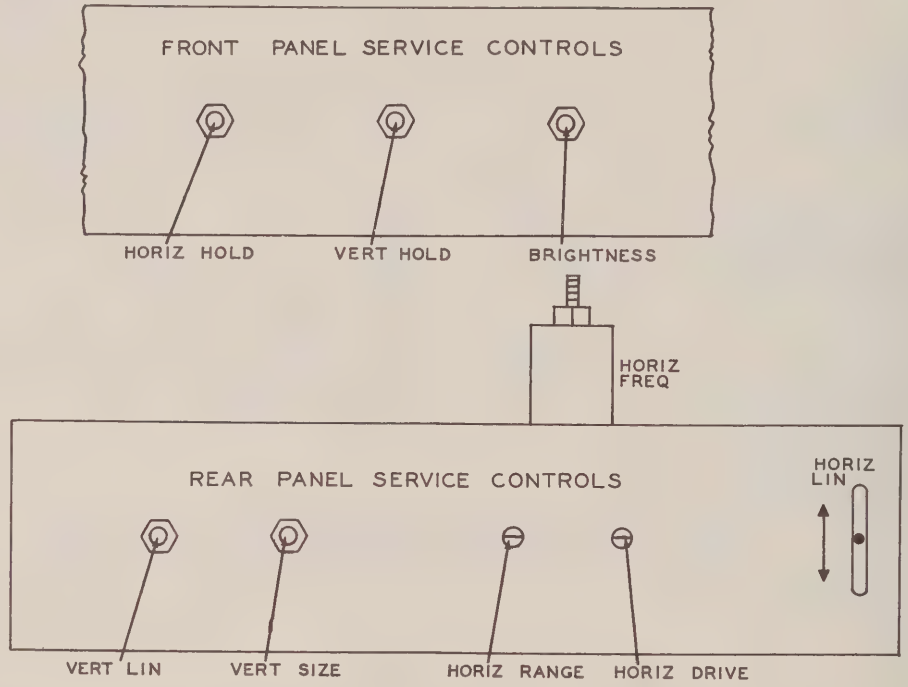
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horiz. freq. slug (L25) until the picture synchronizes horizontally.

If satisfactory results cannot be obtained by the above adjustment see HORIZONTAL SWEEP CIRCUIT ADJUSTMENT on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector buzz, adjust the ratio detector secondary (L24) located on top of chassis. (See tube placement chart).

FUSES

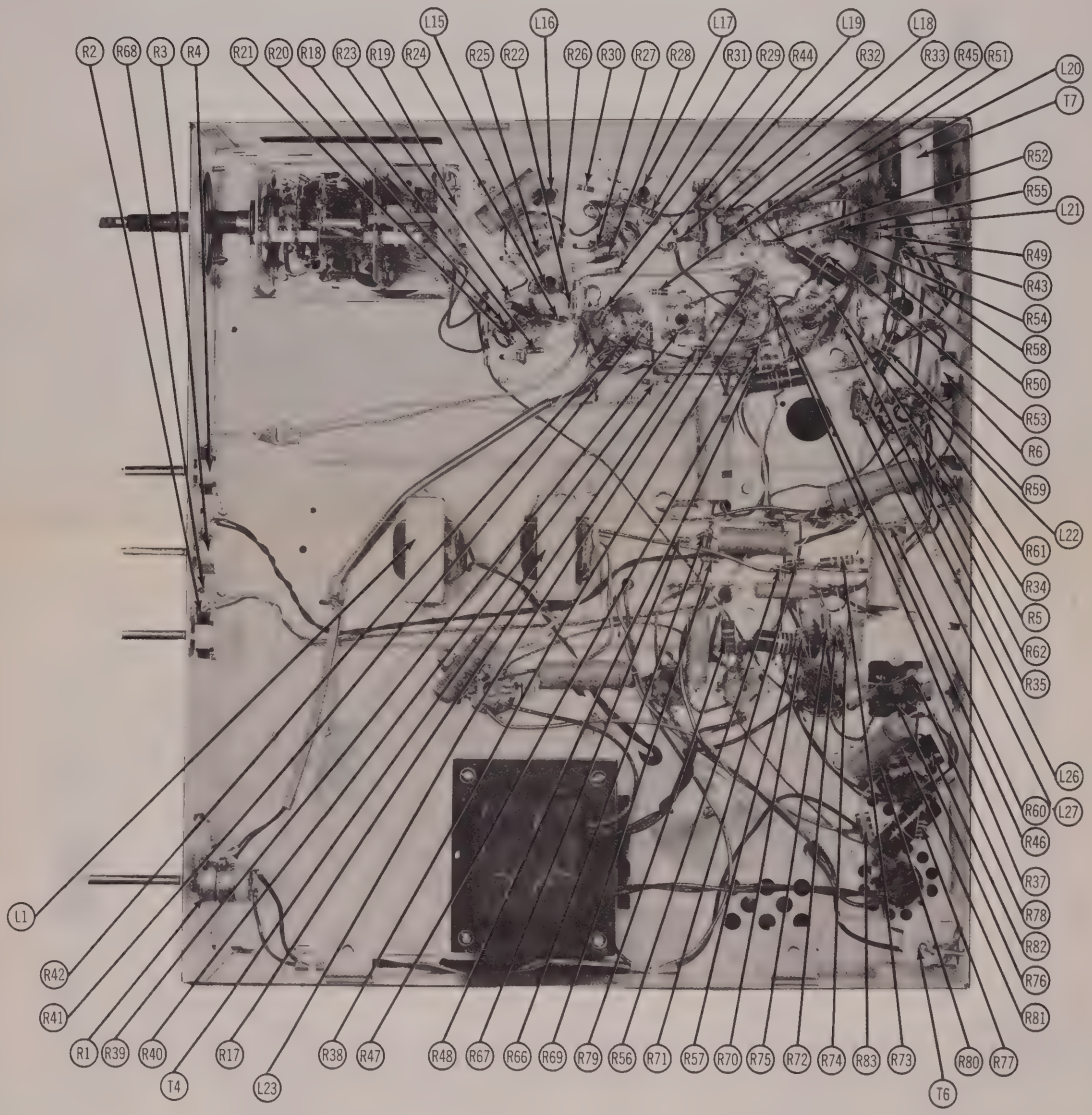
One fuse is used for LV Power Supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 8 wood screws. Remove rear cover.
3. Disconnect speaker. Remove 4 wood screws. Remove speaker. (Not necessary for chassis removal).
4. Remove 4 chassis bolts. Remove chassis.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PHOTOFACT* Folder

*TRADE MARK

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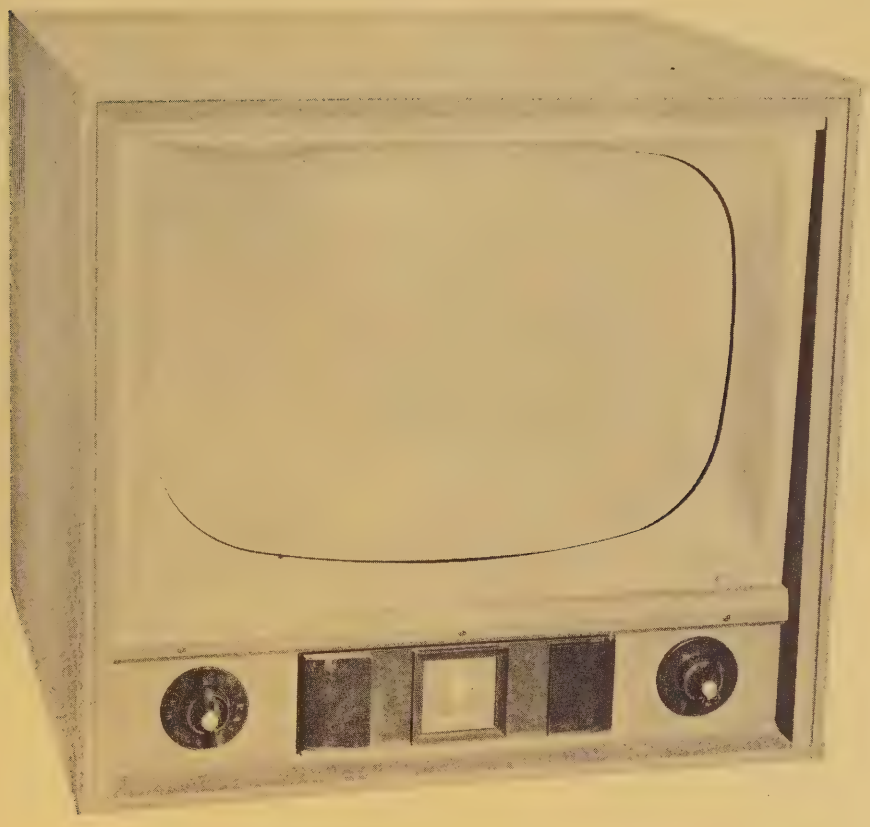

MODEL 2724

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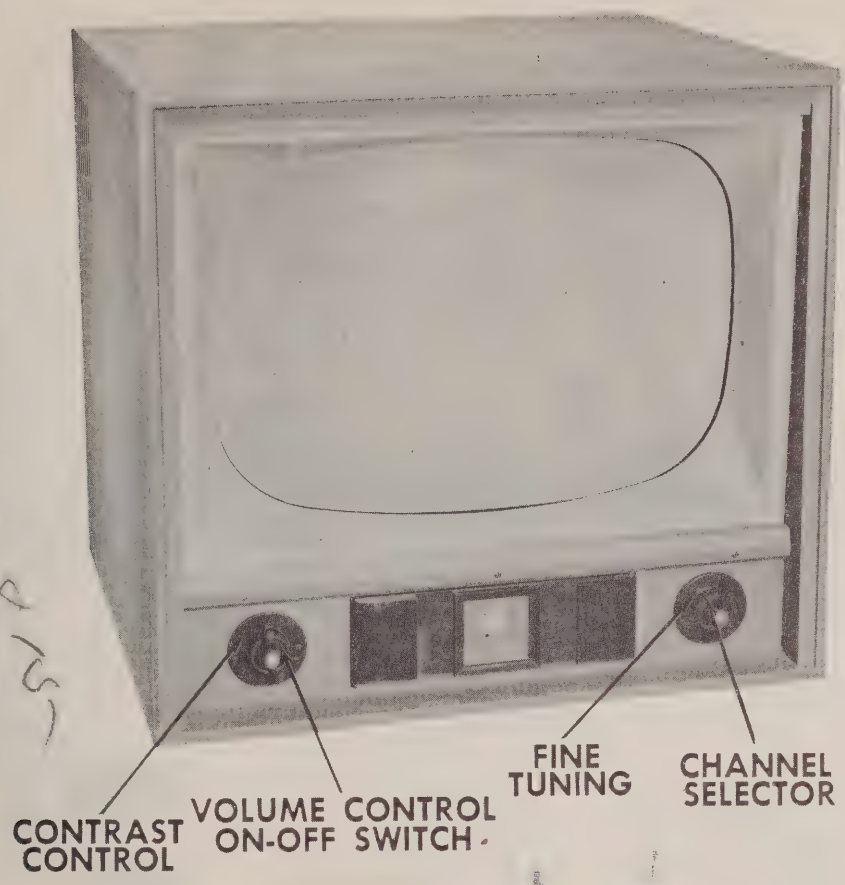

PACKARD BELL
MODELS 2721, 2722 (Ch. 2720),
2723, 2724 (Ch. 2710)

PACKARD-BELL MODEL 2724 (Ch. 2710)

TRADE NAME	Packard-Bell Models 2721, 2722 (Ch. 2720), 2723, 2724 (Ch. 2710)
MANUFACTURER	Packard-Bell Co. -Service Div., 11th. & Hope Sts., Los Angeles 15, California
TYPE SET	Television Receiver
TUBES	Twenty-Seven
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING 1.65 Amp. @ 117 Volts AC
TUNING RANGE-	Channels 2 thru 13, Video IF 25MC, Sound IF 20.5MC (Intercarrier)

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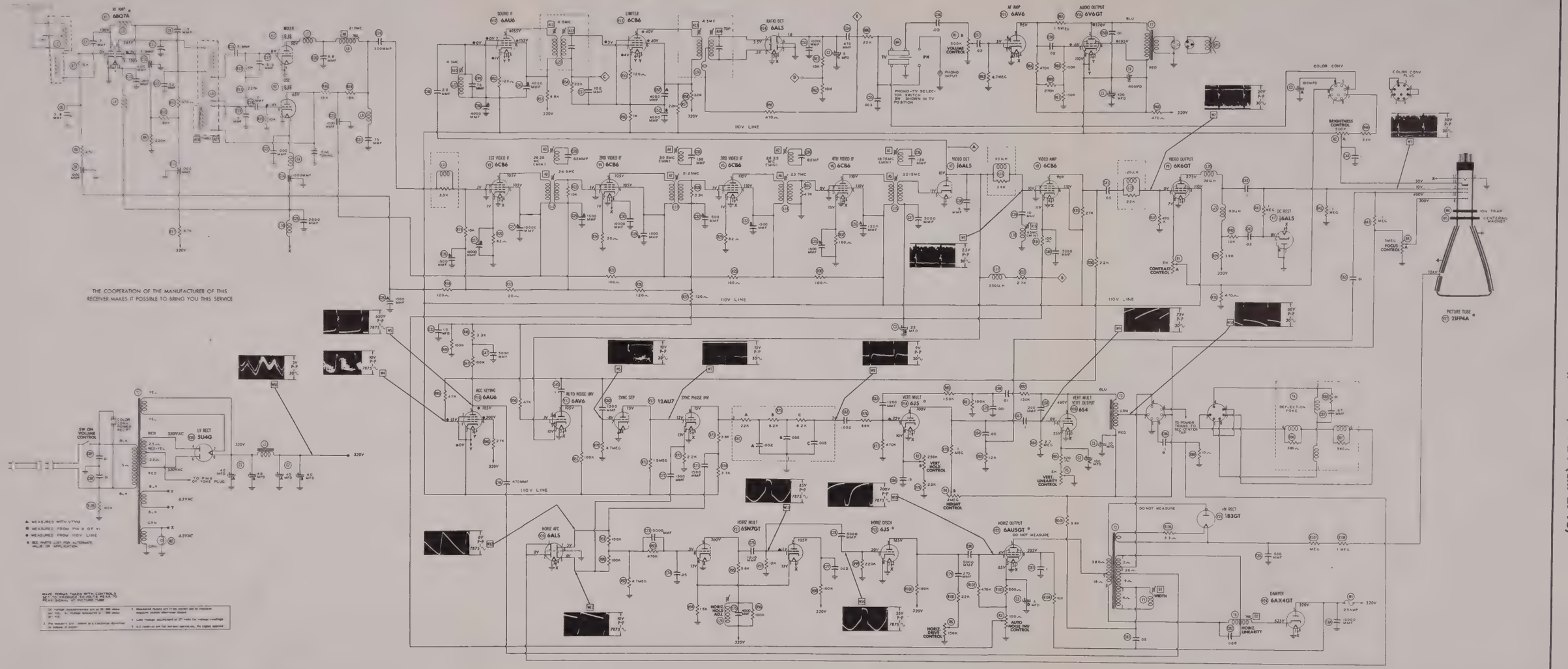

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PACKARD BELL
MODELS 2721, 2722 (Ch. 2720), 2723, 2724 (Ch. 2710)

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CHASSIS TOP VIEW

CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART

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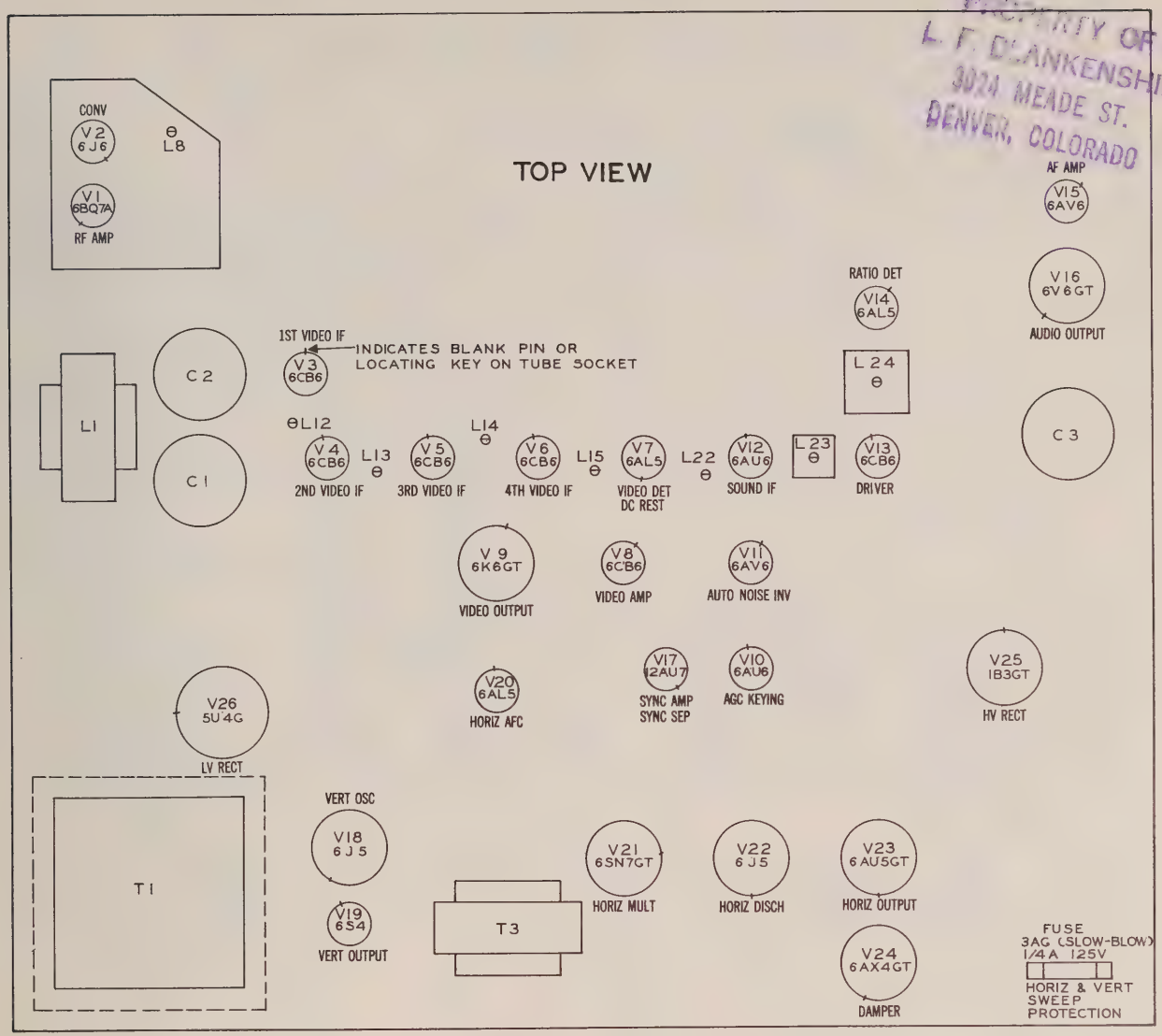


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound- V26

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V16
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster- V8, V9, V27
Has pic, no sound- V12, V13, V14, V15, V16
Overloaded picture - V10

SYNC FAILURE
No vert. sync - V17, V18
No horiz. sync- V17, V20, V21
No vert. or horiz. sync - V17

SWEEP FAILURE
No raster, has sound - V21, V22, V23, V24, V25, V27, Fuse (M1)
No vert. deflection - V18, V19
Poor vert. linearity or foldover - V18, V19
Poor horiz. linearity or foldover - V21, V22, V23, V24
Narrow picture - V21, V22, V23, V24, V25, V26
Vert. off freq. - V17, V18
Horiz. off freq. - V17, V20, V21

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube, V21.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the ungrounded side of C33. Connect the positive lead to chassis.
Early Models have traps on 1st and 2nd video IFs only. The frequencies to which they should be aligned will be indicated in the table by an asterisk (*).
Remove 6AV6 (V11) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	18.75MC (Unmod.)	Any non-interfering channel	DC probe to point (A). Common to point (B).	A1	Adjust for MINIMUM deflection. A1 does not appear in some Models.
2.	"	"	26.25MC *26.5MC	"	"	A2, A3	Adjust A2 and A3 for MINIMUM deflection at 26.25MC. A2 does not appear in some Models and in that case A3 will be adjusted for MINIMUM at 26.5MC.
3.	"	"	20.5MC *20.5MC	"	"	A4	Adjust for MINIMUM deflection.
4.	"	"	22.15MC	"	"	A5	Adjust for maximum deflection. Attenuate generator output to maintain 2.5 to 3 volts at VTVM.
5.	"	"	23.7MC	"	"	A6	"
6.	"	"	21.25MC	"	"	A7	"
7.	"	"	24.8MC	"	"	A8	"
8.	Direct	High side to an ungrounded tube shield floating over converter tube. Low side to chassis.	21.05MC	"	"	A9	Repeat steps 1 through 7. Adjust for maximum deflection.

OVERALL VIDEO IF RESPONSE CHECK

Remove bias battery.
Connect a 5MFD, 50 volt electrolytic capacitor across C47 with positive terminal to chassis.
There should be no drop in AGC voltage when the capacitor is connected. If drop is noted check capacitor for leakage.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead. Connect marker generator to an ungrounded tube shield floating over converter tube. Low side to chassis.	63MC (10MC Swp)	18.75MC 20.5MC 21.55MC 25.0MC 26.25MC	3	Vert. Amp. thru 22KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig. 1. If necessary retouch A5 through A9 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (C). Common to chassis.	A10 A11 A12	Adjust for maximum deflection.
11.	"	"	"	"	DC probe to point (D). Common to chassis.	A13	"
12.	"	"	"	"	DC probe to point (E). Common to point (D).	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (10MC Swp)	4.5MC	Any non-interfering channel	Vert. Amp. to point (C). Low side to chassis.	A10 A11 A12	Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
11.	"	"	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A13	Disconnect stabilizer capacitor C3C. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
12.	"	"	"	"	"	Vert. Amp. to point (E). Low side to chassis.	A14	Reconnect capacitor C3C. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Remove 6AL5, V7, from its socket.
Turn contrast control to maximum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
13.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 4) to pin 2 (grid) of picture tube. Common to chassis.	A15	Adjust for MINIMUM deflection.

OSCILLATOR ALIGNMENT

Replace 6AL5, V7, in its socket.
Connect 5MFD, 50 volt electrolytic capacitor as under Video IF Response Check.
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is rotated to each channel.
Some Models have an additional oscillator adjustment which affects all channels and can be used to shift the fine tuning to correct any tendency to tune a majority of the channels at either extreme of the fine tuning range. This adjustment appears on the alternate tuner schematic as A28.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance , usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 22KΩ to point (A). Low side to chassis.	A16	Adjust to place sound marker in notch as in Fig. 5. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A17	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A18	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A19	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A20	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A21	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A22	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A23	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A24	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A25	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A26	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A27	

THE RF AND MIXER PORTION OF THIS RECEIVER HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT OF THIS PORTION SHOULD NOT BE REQUIRED IN THE FIELD.

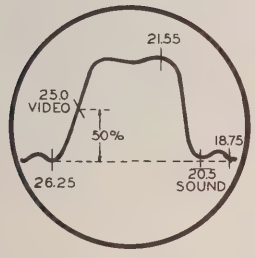


FIG.1

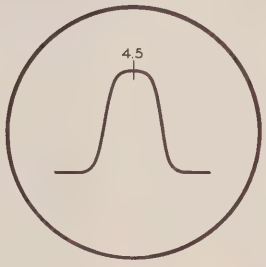


FIG. 2

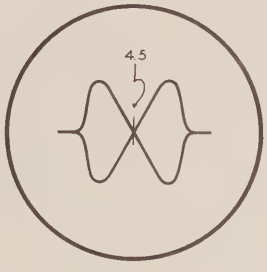


FIG. 3

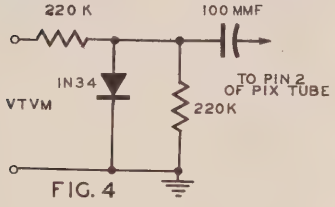


FIG. 4

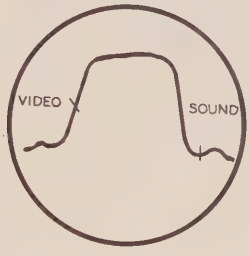
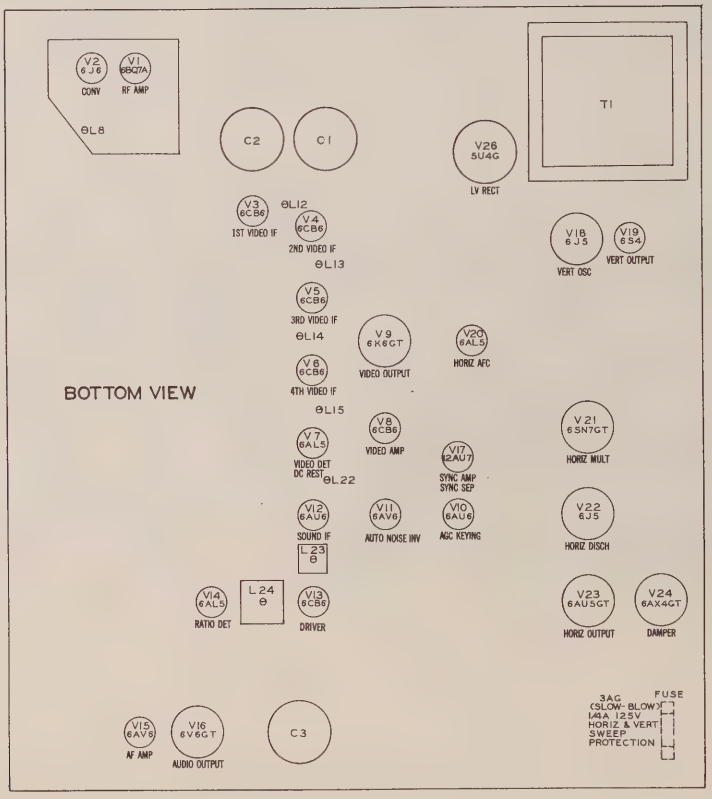


FIG. 5

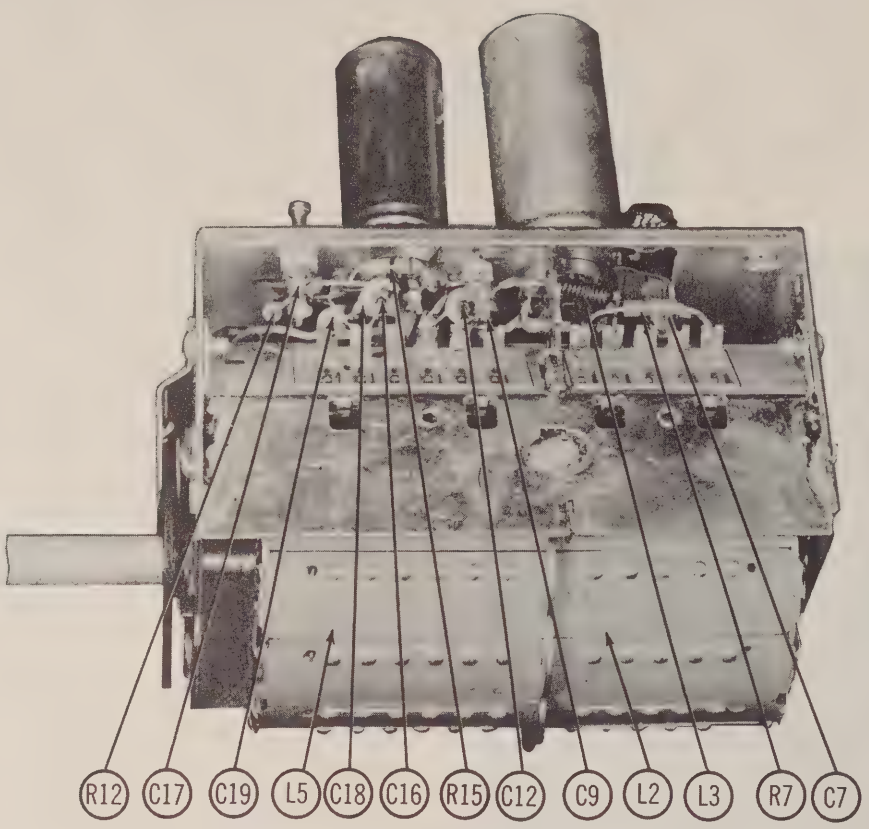
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	INF	147KΩ	0Ω	0Ω	.1Ω	5.1KΩ	125KΩ	INF	0Ω
V 2	6J6	†15KΩ	†15KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	110KΩ	82Ω	0Ω	.1Ω	ǂ300Ω	ǂ300Ω	0Ω		
V 4	6CB6	100KΩ	150Ω	0Ω	.1Ω	ǂ200Ω	ǂ200Ω	0Ω		
V 5	6CB6	100KΩ	82Ω	0Ω	.1Ω	ǂ100Ω	ǂ100Ω	0Ω		
V 6	6CB6	.3Ω	180Ω	0Ω	.1Ω	ǂ0Ω	ǂ0Ω	0Ω		
V 7	6AL5	2 Meg	2.7KΩ	0Ω	.1Ω	100Ω	0Ω	0Ω		
V 8	6CB6	2.7KΩ	200Ω	.1Ω	0Ω	ǂ2.7KΩ	ǂ0Ω	0Ω		
V 9	6K6GT	0Ω	0Ω	†2.9KΩ	ǂ0Ω	470KΩ	470KΩ	.1Ω	700Ω	
V 10	6AU6	ǂ70KΩ	ǂ0Ω	ǂ0Ω	ǂ.1Ω	200KΩ	†27KΩ	ǂ0Ω		
V 11	6AV6	147KΩ	2.6KΩ	0Ω	.1Ω	INF	INF	ǂ100KΩ		
V 12	6AU6	ǂ1Ω	ǂ0Ω	ǂ0Ω	ǂ.1Ω	†6.8KΩ	†6.8KΩ	ǂ120Ω		
V 13	6CB6	ǂ23KΩ	ǂ1.1KΩ	ǂ0Ω	ǂ.1Ω	†33KΩ	†33KΩ	ǂ1KΩ		
V 14	6AL5	20KΩ	0Ω	0Ω	.1Ω	INF	0Ω	INF		
V 15	6AV6	4.7Meg	0Ω	0Ω	.1Ω	INF	INF	†470KΩ		
V 16	6V6GT	0Ω	ǂ.1Ω	†840Ω	†500Ω	†200KΩ	†270KΩ	ǂ0Ω	ǂ0Ω	
V 17	12AU7	ǂ1.5Meg	4.7Meg	0Ω	0Ω	0Ω	ǂ6.6KΩ	ǂ1.5Meg	2.2KΩ	.1Ω
V 18	6J5	0Ω	0Ω	▲3.3Meg	▲2.3Meg	470KΩ	▲155KΩ	.1Ω	0Ω	
V 19	6S4	INF	2.6KΩ	INF	0Ω	.1Ω	2.2Meg	INF	INF	▲7.3KΩ
V 20	6AL5	10Ω	10Ω	0Ω	.1Ω	4.8Meg	0Ω	4.8Meg		
V 21	6SN7GT	12KΩ	†100KΩ	1.5KΩ	5.1Meg	†5.7KΩ	1.5KΩ	.1Ω	0Ω	
V 22	6J5	0Ω	.1Ω	†180KΩ	INF	220KΩ	10Ω	0Ω	0Ω	
V 23	6AU5GT	470KΩ	0Ω	600Ω	INF	▲25Ω	INF	.1Ω	†10KΩ	
V 24	6AX4GT	INF	INF	3 Meg	INF	†43Ω	85KΩ	0Ω	.1Ω	
V 25	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap ▲405Ω
V 26	5U4G	INF	110KΩ	INF	25Ω	INF	23Ω	INF	110KΩ	
V 27	21FP4A	0Ω	1 Meg	Pin 6 ▲10KΩ	Pin 10 ▲1 Meg	Pin 11 ǂ180KΩ	Pin 12 .1Ω			

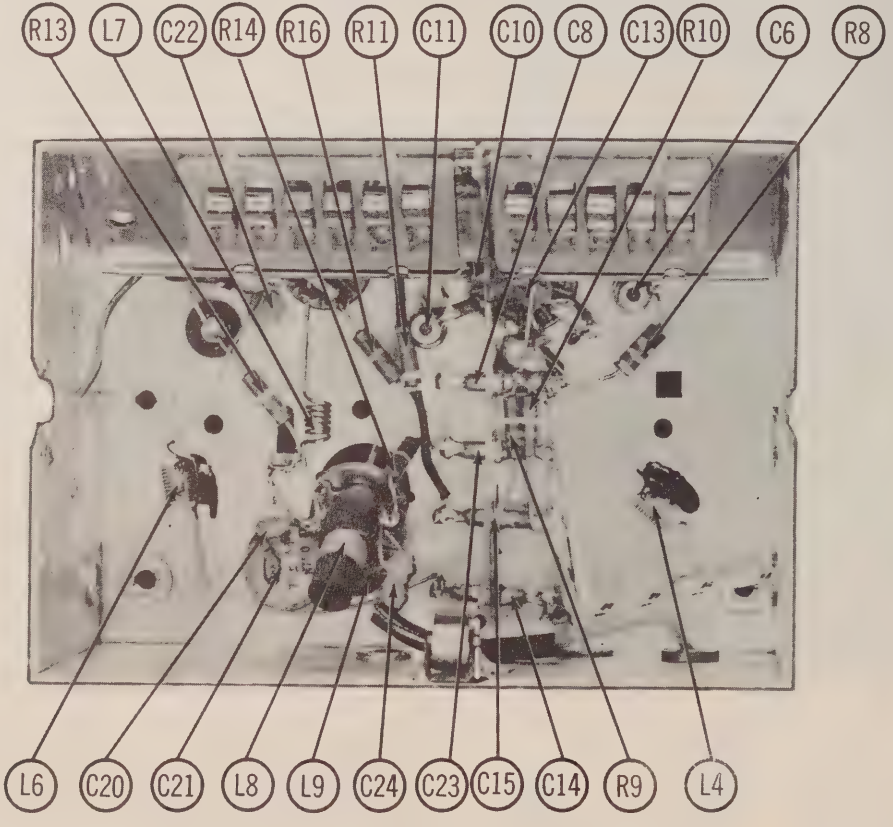
ǂ MEASURED FROM 110V LINE
† MEASURED FROM PIN 8 OF V26
▲ MEASURED FROM PIN 3 OF V24



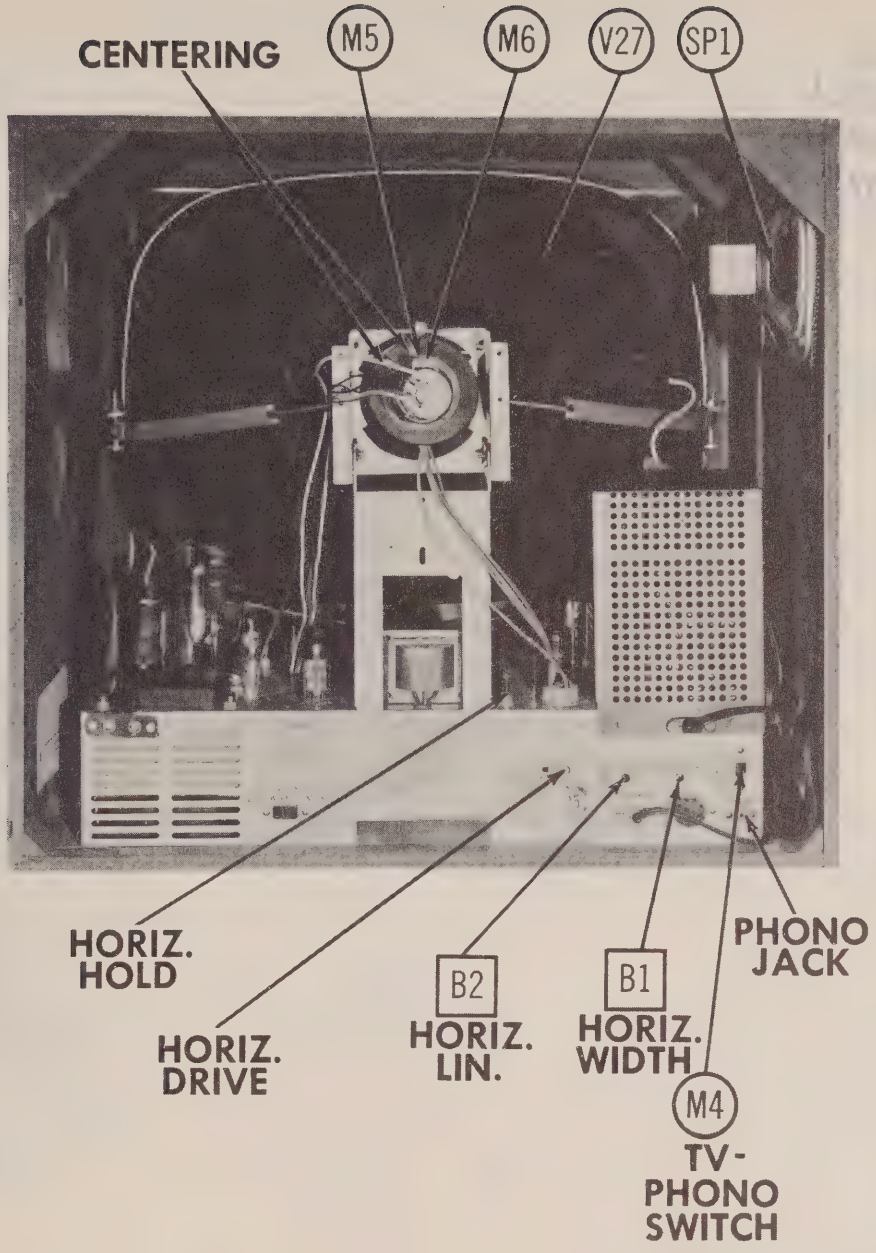
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold adjustment to synchronize the picture horizontally.

Adjust the horizontal drive control clockwise as far as possible without the presence of vertical white lines or compression of the center of the picture.

Adjust the width slug (B1) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B2) for a picture that is symmetrical from left to right.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Check T4A for open. Check for loose connection or solder joint or broken wire anywhere between T2 and T4A.

INSUFFICIENT SWEEP

Check by substituting V21, V22, V23, V24 and V26. Check amplitude of waveform W15.

If Insufficient	If Sufficient
Check components of V21 and V22 particularly C79, R6 and R101 for change in value. Check coupling network between V22 and V23.	Check T2, T4A, T5, T6 and C81. Check cathode components of V23. Check components of damper circuit.

DRIVE LINES

Substitute V22 and V23. Check C79, R6 and R101 for change in value.

FOLDS

Substitute V23 and V24. Check T2 and T4A. Check damper components.

XMAS TREE EFFECT

Substitute V21. Check C75, R96 and L25.

VERTICAL

LOSS OF SWEEP

Substitute V18 and V19. Check coupling components between V18 and V19. Check T3 and T4B.

INSUFFICIENT SWEEP

If adjustment of both height and vertical linearity controls fail to give sufficient height, substitute V18 and V19. Check associated components. Check boost B plus

If Insufficient	If Sufficient
Substitute V23 and V24. Check damper filter components.	Check T3 and T4B. Check associated components.

COMPRESSED TOP

Substitute V18 and V19. Check signal at W9.

If Unsatisfactory	If Satisfactory
Check components of V18 and coupling between V18 and V19.	Check T3 and T4B. Check associated components.

COMPRESSED AT BOTTOM

Substitute V19. Check C2C and C67.

SYNC

HORIZONTAL

LOSS OF SYNC

Substitute V17 and V18. Check integrator network and components of V18.

CRITICAL HOLD

Substitute V17 and V18. Check integrating network and feedback system. Check components of V18.

TRIGGERING

Substitite V18 and check associated components.

VERTICAL

LOSS OF SYNC

Substitute V17, V20, V21 and V22. Check L25, C75 and R96. Check coupling V17 and V20 and between V20 and V21. Check components of multivibrator.

CRITICAL SYNC

Substitute V17, V20, V21 and V22. Follow procedure outlined under LOSS OF SYNC.

PULLING

Substitute V17, V20, V21 and V22. Check associated components. Check all tubes in tuner, video IF, sync and horizontal sweep circuits for filament to cathode leakage.

VIDEO

SOUND BARS

Check adjustment of A15 (4.5MC trap). Check local oscillator adjustment and video IF Alignment.

POOR RESOLUTION

Check alignment of Video IF. If alignment cannot be brought within tolerance, substitute video IF tubes and check circuit components.

SMEAR

Substitute V8 and V9. Check associated components, especially the peaking coils.

ONE WIDE BLACK BAR

Check tuner, video IF, video detector and video amplifiers for filament to cathode leakage.

POOR CONTRAST

Substitute V8 and V9. Check associated components. Check picture tube.

AUDIO

WEAK OR NO SOUND

Check by substitution, V12, V13, V14, V15 and V16. Check circuit components. Check alignment of sound and video IFs.

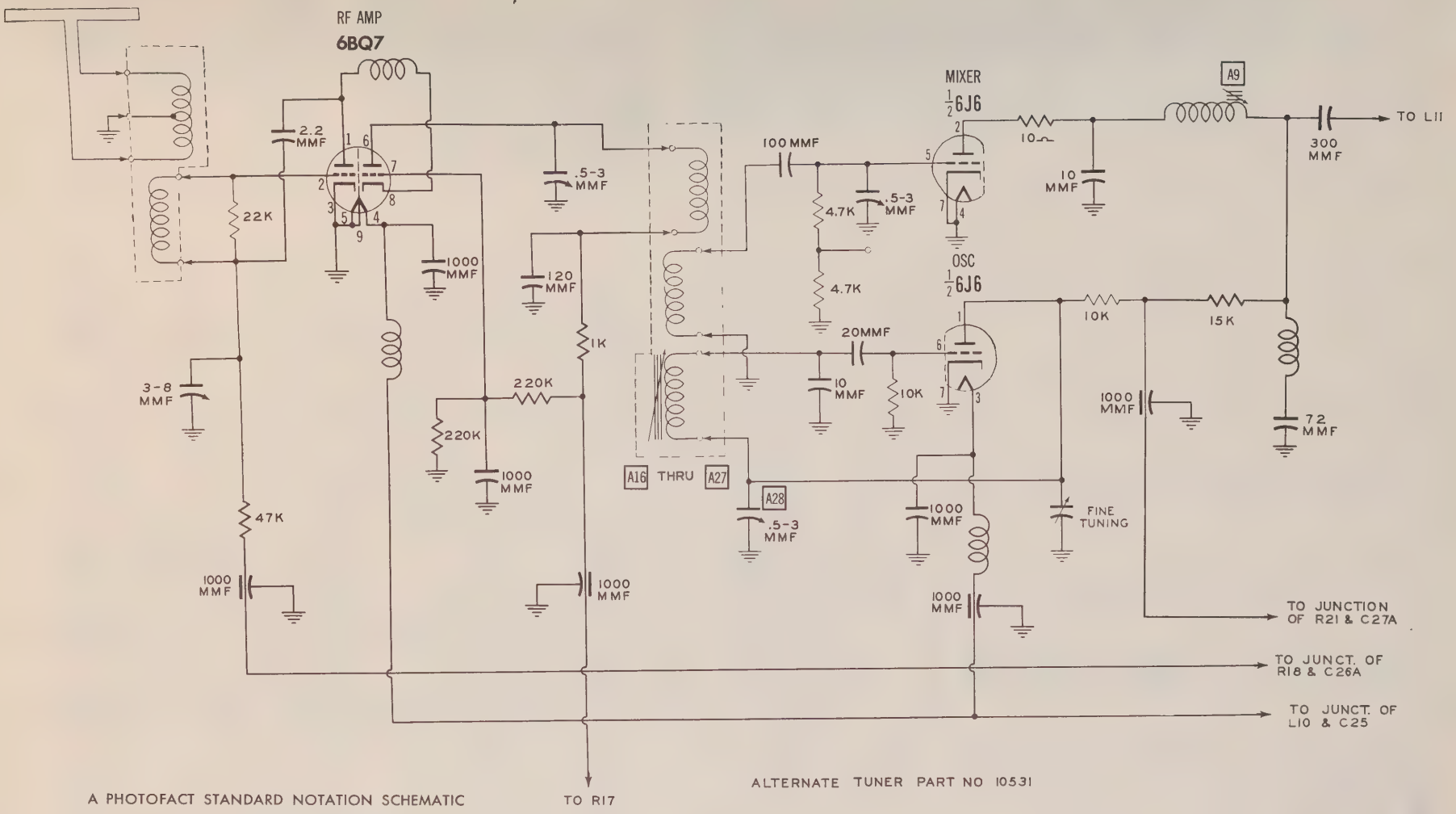
BUZZ

Adjust ratio detector secondary for minimum buzz. If still noticeable, substitute V14 and readjust.

DISTORTED

Check audio amplifier stages V15 and V16 using audio signal generator and scope

If Undistorted	If Distorted
Check adjustment of ratio detector and sound IF stages. Check video IF alignment.	Check components of amplifier stage where distortion occurs.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE TUNER PART NO 10531

ALTERNATE TUNER SCHEMATIC

MODELS 2721, 2722 (Ch. 2720), 2723, 2724 (Ch. 2710)

PACKARD BELL

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No	USE	REPLACEMENT DATA: Packard-Bell PART No	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1A	RF Amplifier	5BQ7A	6BQ7A	9AJ	These tubes are directly interchangeable
B	RF Amplifier	6BQ7	6BQ7	9AJ	
C	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Converter	6J8	6J8	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	4th. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Detector-DC Restorer	6AL5	6AL5	6BT	
V8	Video Amplifier	6CB6	5CB6	7CM	
V9	Video Output	6K6GT	6K6GT	7S	
V10	AGC Keying	6AU8	6AU8	7BK	
V11	Automatic Noise Inverter	6AV6	6AV6	7BT	
V12	Sound IF Amp.	6AU6	6AU6	7BK	
V13	Driver	6CB6	6CB6	7CM	
V14	Ratio Detector	6AL5	6AL5	6BT	
V15	AF Amplifier	6AV6	6AV6	7BT	
V16	Audio Output	6V6GT	6V6GT	7S	
V17	Sync Separator Sync Phase Inv.	12AU7	12AU7	9A	
V18	Vert. Mult.	6J5	6J5	6Q	
V19	Vert. Mult. Vert. Output	6S4	6S4	9AC	
V20	Horiz. AFC	6AL5	6AL5	6BT	
V21	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V22	Horiz. Discharge	6J5	6J5	6Q	
V23A	Horiz. Output	6AU5GT	6AU5GT	6CK	
B	Horiz. Output	6AV5GT	6AV5GT	6CK	
V24	Damper	6AX4GT	6AX4GT	4CG	
V25	HV Rectifier	1B3GT	1B3GT	3C	
V26	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: SYLVANIA PART No.	RTMA BASE TYPE	NOTES
V27	21FP4A	21FP4A 21FP4 ①	12C	① Circuit Changes necessary.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C1A	≋40	450		AFH3-159		C1IB		FP375	TVL-3764	
B	≋40	450	24055							
C	≋100	200								
C2A	≋40	450		AFH3-159		C1IB		FP375	TVL-3764	
B	≋40	450	24055							
C	≋100	200								
C3A	100	15								
B	≋25	25	24069	AFH4-101				FP424.1	R1316	
C	≋5	75								
D	≋5	75								
C4	40	350	24063	PRS450/40		BR4035		TC78	TVA-1611	
C5	10	600	24068	PRS600/10		BRHV610		TC92	TVA-1955	
C6	3-8									
C7	3			SINP0			NP0K-030	ZT-553		
C8	1000			CN-1-001	MFT-1000				503C-D1	
C9	1.5			SIL.5NP0	TCZ-1.5		NP0K-1R5	ZT-5516	5TCCB-V15	
C10	1000			CN-1-001	MFT-1000				503C-D1	
C11	.5-3									
C12	52			SIL	D6-500	TM5Q5	GP1K-510	UC-545	5CA-Q5	
C13	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C14	1000			CN-1-001	MFT-1000				503C-D1	
C15	1000			CN-1-001	MFT-1000				503C-D1	
C16	51			SID1			GP1K-510			
C17	.5-3									
C18	10			SIDNP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C19	5			SI5N750	TCN-5		N750K-050	ZT-555	5TCUB-V5	
C20	6.8			SI6.8NP0	TCZ-6.8		NP0K-6R8	ZT-5568	5TCCB-V6R	
C21	75						N750L-730			
C22	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C23	1000			CN-1-001	MFT-1000				503C-D1	
C24	100			SID00	D6-101		GP2K-301	UC-533	5GA-T3	
C25	5000		23931	BPD-005	MD-502	TM5D5	811-005	DC-525	5HK-D5	
C26A	1500		23954	BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C27A	10000		23962	BPD-2X01	DD-3-103	TM5DS1	811-01	DC-511	5HX-2S1	
B	10000						811-01	DC-511		
C28	85	500								
C29A	1500		23954	BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C30	10000		23959	BPD-01	DD-1032	TM5S1	811-01	DC-511	5HK-S1	
C31	150	500		1469-00015		SR5Y15		MCB236		
C32A	1500		23954	BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C33	1.9	100	23040	484-1.9		PZ3W1		PT41	2TM-M3	
C34	85	500								
C35A	1500		23954	BPD-2X0015	DD-2-152	TM5DD15	812-0015	DCD-5215	5HK-2D15	
B	1500									
C36	150	500		1469-00015		SR5T15		MCB236		
C37	5000		23931	BPD-005	MD-502	TM5D5	811-005	DC-525	5HK-D5	
C38	5		23908	SI5N750	TCN-5		N750K-050	NT-555	5TCUB-V5	
C39	10		23927	SIDNP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C40	5000		23931	BPD-005	MD-502	TM5D5	811-005	DC-525	5HK-D5	
C41	.05	200	23017	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C42	.1	600	23012	P688-1	DF-104	PTK6P1		PT601	6TM-P1	

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C43	.02	600	23007	P688-02	DD-203	DTE6S2		PT612	6TM-S2	
C44	.1	200	23018	P288-1	DF-104	PJ1P1		PT401	2TM-P1	
C45	.1	200	23018	P288-1	DF-104	PJ1P1		PT401	2TM-P1	
C46	470	1000	23967	HVD15-00047				MCE247	10GA-T47	
C47	5000		23931	BPD-005	MD-502	TM5D5	811-005	DC-525	5HK-D5	
C48	2.2		23969	SI2.2NP0	TCZ-2.2	-	NP0K-2R2		5TCCB-V2	
C49	75									
C50A	4000		23955	BPD-2X004	D6-402	TM5DD4	822-004	DCD-524	5HK-2D4	
B	4000				D6-402					
C51	100		≋23970	SIL00	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C52A	4000		23955	BPD-2X004	D6-402	TM5DD4	822-004	DCD-524	5HK-2D4	
B	4000				D6-402					
C53	10000		23939	BPD-01	D6-103	TM5S1	81-01	DC-511	5HK-S1	
C54	470		23916	SI470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C55	.003	600	23016	P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C56	.02	600	23007	P688-02	DD-203	PTE6S2		PT612	6TM-S2	
C57	.02	600	23007	P688-02	DD-203	PTE6S2		PT612	6TM-S2	
C58	.02	600	23007	P688-02	DD-203	PTE6S2		PT612	6TM-S2	
C59	.01	600	23008	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C60	1500		23936	SIL500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C61A	.002			P688-002		PTE6D22		PT622		
B	.005		†	P688-005	†PC-100	PTE6D5	†1405-01	PT625	†10IC1	
C	.005			P688-005		PTE6D5		PT625		
C62	.002	600	23002	P688-002	D6-202	PTE6D22	GP2-333-202	PT622	6TM-D2	
C63	1200	500	23219							
C64	.05	600	23019	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C65	.01	600	23006	P688-01	D6-103	PTE6S1		PT611	6TM-S1	
C66	.5	300	23035	P288-5		PJ2P5		PT405	2TM-P5	
C67	.1	600	23012	P688-1	DF-104	PTK6P1		PT601	6TM-P1	
C68	200	2500	23958						30GA-T2	
C69	.01	600	23006	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C70	.001	600	23001	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C71	1500		23936	SIL500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C72	1500		23936	SIL500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C73	5000	†	23960	SIL500	D6-502	TM5D5	GP2-333-502	UC-525	5HK-D5	
C74	.05	200	23017	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C75	4000	500	23208	1464-004		IDR5D4		MCB463	MS-24	
C76	1200	500	23219							
C77	.002	600	23002	P688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C78	5000		23931	BPD-005	MD-502	TM5D5	811-005	DC-525	5HK-D5	
C79	370		23943	SIZ70	D6-371		GP2K-371	UC-5337	5GA-T27	
C80	5000		23931	BPD-005	MD-502	TM5D5	811-005	DC-525	5HK-D5	
C81	.1	600	23012	P688-1	DF-104	PTK6P1		PT601	6TM-P1	
C82	.068	400	23041	P468-068		PTE4S68			4TM-S68	
C83	.05	600	23010	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C84	10000		23939	BPD-01	D6-103	TM5S1	811-01	DC-511	5HK-S1	
C85	500	20000	23959	HV20C	TV3-500	MM-C20T5	413-501		20DK-T5	
C86	.1	600	23012	P688-1	DF-104	PTK6P1		PT601	6TM-P1	Note 1
C87	47	2000	23956					MCL447	30GA-Q47	
C88	.01	125VAC	23932	582ZX-01		PJ6S1		PT611	6TM-S1	
C89	.01	125VAC	23932	582ZX-01		PJ6S1		PT611	6TM-S1	

Note 1, Model 2722 uses .05MFD in this application (part #23010)

- ≋ Items C5A, R54 are combined in one unit.
- † Items C61A, C61B, C61C, R75A, R75B, R75C are combined in one unit.
- ≋ Items C73, R93 are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: MALLORY PART No.	INSTALLATION NOTES
R1A	5000Ω		25850A	QJ-4634		SBB-527-S	UF53R	Contrast-Panel
B	500KΩ						UR55A †	Volume Tap② 100KΩ-Rear
C	Switch						US-28	Attach to R1B
R2A	500KΩ		25848	QJ-461**			UF55L	Brightness-Panel
B	250KΩ						UR254L	Vert. Hold-Rear
R3A	100Ω	2	25846X	W-100	A43-100	V-121	R100L	Automatic noise inverter-Wire Wound
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R3A
R4A	3 Meg		25847	QJ-469*				Focus-Panel
B	3 Meg							Height-Rear
R5A	5000Ω	2	25845X	WK-5000	A43-5000	V-135	R5000L	Vert. Lin.-Wire Wound
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	DS-36	Attach to R5A
R6A	150KΩ		25839C	QU-129	AG-52-8	AB-48	U-43	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A

† UNIVERSAL REPLACEMENT-(MALLORY EXACT DUPLICATE PART NO. UES258).
* CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS Bll-140 & P9-104 (Panel) Bll-140 & Rll-112 (Rear).
** CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS Bll-133 & P9-104 (Panel) Bll-129 & Rll-112 (Rear).
◆ CONCENTRIKIT EQUIVALENT-KIT K-2, BASE ELEMENTS & SHAFTS Bl7-114 & Pl-112 (Panel) Bl3-133X & R2-304 (Rear) & SWITCH 78-1.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7	15KΩ			BTS-15K	
R8	47KΩ				
R9	220KΩ			BTS-220K	
R10	180KΩ			BTS-180K	
R11	470Ω			BTS-470	
R12	10KΩ			BTS-10K	
R13	220KΩ			BTS-220K	
R14	15KΩ			BTS-15K	
R15	10KΩ			BTS-10K	
R16	15KΩ			BTS-15K	
R17	4700Ω	2	73423	BTS-4700	
R18	120Ω		73014	BTS-120	
R19	10KΩ		73037	BTS-10K	
R20	82Ω		73012	BTS-82	
R21	100Ω		73013	BTS-100	
R22	120Ω		73014	BTS-120	
R23	10KΩ		73037	BTS-10K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R24	150Ω		73015	BTS-150	
R25	100Ω		73013	BTS-100	
R26	120Ω		73014	BTS-120	
R27	12ΩΩ		73014	BTS-120	
R28	3300Ω		73031	BTS-3300	
R29	82Ω		73012	BTS-82	
R30	100Ω		73013	BTS-100	
R31	4700Ω		73033	BTS-4700	
R32	180Ω		73018	BTS-180	
R33	2700Ω		73030	BTS-2700	
R34	100Ω		73013	BTS-100	
R35	2700Ω		73030	BTS-2700	
R36	22KΩ		73041	BTS-22K	
R37	470KΩ		73157	BTS-470K	
R38	470Ω		73021	BTS-470	
R39	3900Ω	2	73432	BTB-3900	
R40	10KΩ		73037	BTS-10K	

RESISTORS (CONT.)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R41	1 Meg		73161	BTS-1 Meg	
R42	1 Meg		73161	BTS-1 Meg	
R43	1 Meg		73161	BTS-1 Meg	
R44	33KΩ		73043	BTS-33K	
R45	47KΩ		73045	BTS-47K	
R46	27KΩ		73048	BTS-27K	
R47	150KΩ		73149	BTS-150K	
R48	3300Ω		73031	BTS-3300	
R49	100KΩ		73149	BTS-100K	
R50	47KΩ		73045	BTS-47K	
R51	100KΩ		73149	BTS-100K	
R52	120Ω		73014	BTS-120	
R53	6800Ω		73235	BTA-6800	
R54	22KΩ	≋	≋23970	BTS-22K	
R55	120Ω		73014	BTS-120	
R56	100KΩ		73149	BTS-100K	
R57	22KΩ		73041	BTS-22K	
R58	33KΩ	2	73443	BTB-33K	
R59	470Ω		73021	BTS-470	
R60	22KΩ		73041	BTS-22K	
R61	10KΩ		73037	BTS-10K	
R62	10KΩ		73037	BTS-10K	
R63	4.7Meg		73169	BTS-4.7Meg	
R64	470KΩ		73157	BTS-470K	
R65	1.5Meg		73163	BTS-1.5Meg	
R66	100KΩ		73149	BTS-100K	
R67	150KΩ		73051	BTS-150K	
R68	470Ω	2	73421	BTS-470	
R69	270KΩ		73054	BTS-270K	
R70	4.7Meg		73169	BTS-4.7Meg	
R71	1.5Meg		73163	BTS-1.5Meg	
R72	2200Ω		73029	BTS-2200	
R73	3300Ω		73031	BTS-3300	
R74	3300Ω		73031	BTS-3300	
R75A	22KΩ	†		BTS-22K	
B	8200Ω			BTS-8200	
C	8200Ω			BTS-8200	

≋ Items R54, C5i are combined in one unit.
† Items R75A, R75B, R75C, C61A, C61B, C61C are combined in one unit.
≋ Items R93, C73 are combined in one unit.

ITEM No.	RATING	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: TRIAD PART No.	REPLACEMENT DATA: RCA TYPE No.
T1	PRI. 117 VAC ① 1.65A	83043	P-8165	P-3070	TP-370 ①	R-39BC	
	SEC. 1 665VCT 170ADC						
	SEC. 2 ③ 3A						
	SEC. 3 ≋ 1.3A						
	SEC. 4 6.3VAC ≋ 9A						

① Drill new mounting holes.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: TRIAD PART No.	REPLACEMENT DATA: RCA TYPE No.	NOTES
T2	396Ω Tap ② 18Ω	41Ω Tap ≋ 40Ω 13.39Ω	89438		HVO-9.1①	TFB-13 ②	D 19	225T1 ④	Horiz. Output Trans.
		SEC. 2 0Ω							
T3	1700Ω Tap ≋ 4.7Ω		89434	A-8141	A-3039	TS 0-12	A-104X	226T1	Vert. Output Trans.
T4A	35Ω		29542	DY-11A	MDF-71	TT-7	Y-19 ⑦		Horiz. Deflection Coils.
B	45Ω								Vert. Deflection Coils.
T5	8Ω		29540	WC-5③④	MWC-1③④	TWL-1	WC-12⑤	212R1	Width Coil
T6A	7.46Ω Tap ⑨ 1.8Ω		29531			TL-3		309R1	Horiz. Lin. Coil
B									

① Connect linearity coil & Capacitor in plate circuit of 6AX4.
② Connect as in original circuit except; connect pertinent term "T" to new term #4.
③ Enlarge mounting hole.
④ Do not use secondary.
⑤ Connect to blue and red dot terminal.
⑥ Do not connect term 7 to term 8.
⑦ Use original deflection coil network.
⑧ See instruction sheet packed with unit for terminal connections.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: TRIAD PART No.	NOTES
T7	4.5KΩ	3.3Ω	395Ω	.61Ω	89438	A-3877	A-2930	RO-8	S-3X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	NOTES
SP1	6"	PM	3.3Ω	83305	SI-108 Mod. P6-X	6A1	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE @ CURRENT 1000 ~/s	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: TRIAD PART No.
L1	.170ADC	43Ω	1.45 Hy.	27005	C-2325	C-2991	TR-1733 ①	C-17X

① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Packard-Bell PART No.	REPLACEMENT DATA MILLER PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L2	Ant. Coils	0Ω CT	0Ω				
L3	Neutr.Coil	0Ω					
L4	Fil. Choke	0Ω					
L5	RF, Mixer Grid & Osc. Coils	0Ω					
L6	Fil. Choke	0Ω					
L7	RF Choke	0Ω					
L8	1st. Video IF	.6Ω					
L9	RF Choke	.4Ω					
L10	Fil. Choke	0Ω		29551	6175	19-3001	.8 Microhenry
L11	RF Choke	.8Ω		29523			Wound on 3.3KΩ resistor
L12	2nd. Video IF	.3Ω	.3Ω	29553			Includes trap
L13	3rd. Video IF	.3Ω	.3Ω	29554			Includes trap
L14	4th. Video IF	.3Ω	.3Ω	29553			Includes trap, see Note 1
L15	5th. Video IF	.3Ω	.3Ω	29554			Includes trap, see Note 1
L16	Series Peaking Coil	6.5Ω		29552	6177 *	19-3093 *	93 Microhenries, wound on 3.9KΩ resistor
L17	Shunt Peaking Coil	11Ω		29509	6181	19-3250	250 Microhenries
L18	4.5MC trap	3.7Ω		29548	1470	20-1005 †	
L19	Series Peaking Coil	6.8Ω		29506	6178	19-3125 ◓	120 Microhenries, wound on 22KΩ resistor
L20	Series Peaking Coil	4Ω		29520	6176	19-3036	36 Microhenries
L21	Shunt Peaking Coil	6.3Ω		29507	6177	19-3093	93 Microhenries
L22	1st. Sound IF	1Ω		29053	1469	17-3400	
L23	2nd. Sound IF	3.2Ω	1.9Ω	29541	1466 ■	16-3445	
L24	Ratio Det.	4.6Ω	.3Ω CT	29054		17-3493	Tertiary Winding ⓐ 1.05Ω
L25	Horiz. Osc.	115Ω		29527	6210	19-1576	

■ Drill one new mounting hole.
* Parallel with 39KΩ resistor.
† Disconnect capacitor in parallel.
◓ Parallel with 22KΩ resistor.
Note 1. Trap is not used in early production Models.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Packard-Bell PART No. FUSE	Packard-Bell PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG (Slo-Blo)	1/4A 125V	45005		313.250 (3AG-1/4A-Slo-Blo)	375001	MDL-1/4	4405

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M2	Lamp	54002	Channel Indicator, Type #47
M3A	RF Tuner	10532	
B	RF Tuner	10531	(Used in early Models)
M4	Switch		TV-Phono Selector
M5	Centering Magnet		
M6	Ion Trap	28099	
	Cabinet	2721	Model 2721 (Specify Finish)
	Cabinet	2722	Model 2722 (Specify Finish)
	Cabinet	2723 STD	Model 2723 Standard (Specify Finish)
	Cabinet	2723 DLX	Model 2723 Deluxe (Specify Finish)
	Cabinet	2724	Model 2724 (Specify Finish)
	Escutcheon	41049	Specify Finish (All Models)
	Knob	52068	Fine Tuning, (Specify Finish) All Models
	Knob	52069-1	Off/On Volume (Specify Finish) All Models
	Knob	52070	Contrast (Specify Finish) All Models
	Knob	52076-1	Channel Selector, Models 2721 and 2722 (Specify Finish)
	Knob	50267-1	Channel Selector, Models 2723 and 2724 (Specify Finish)

TROUBLE SHOOTING AIDS (CONT.)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V21, V22, V23, V24 and V25. Check 1/4 amp. fuse located in the high voltage cage. Check waveform at W15.

If Unsatisfactory	If Satisfactory
Check components of horizontal oscillator and horizontal discharge tubes. Check coupling capacitor between V22 and V23.	Check T2, T4A, T5, T6 and associated components. Check high voltage filter for short. Check damper circuit.

INSUFFICIENT HIGH VOLTAGE

If substitution of V21, V22, V23, V24, V25 and V26 fail to correct this trouble, follow procedure outlined under LOSS OF HIGH VOLTAGE.

BLOOMING

Check by substitution V21, V22, V23, V24, V25 and V26. Check high voltage filter including R107 and R109. Check picture tube.

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POWER

SMALL RASTER AND WEAK SOUND

Substitute V26. Check B plus circuit for shorts. Check T1.

DIM PICTURE

Follow procedure under SMALL RASTER AND WEAK SOUND and BLOOMING.

GENERAL

RASTER BUT NO SOUND OR PICTURE

Substitute V1, V2, V3, V4, V5, V6 and V7. Check Video IF alignment.

SNOW BUT NO PICTURE OR SOUND

Substitute V1 and check tuner components. Check antenna connection.

INTERMITTANT STREAKS

Check high voltage circuit for corona discharge and arcing.

SET DEAD

Substitute V26 and check B plus circuit for shorts and open circuits.

Symptoms shown above are assumed and are not indicative of the quality and workmanship of this receiving equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

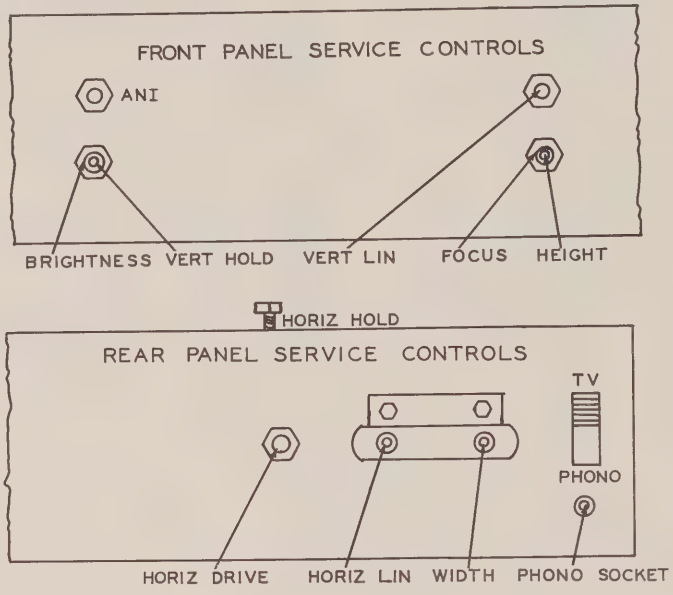
To clean safety glass remove 3 wood screws holding wood strip at bottom of cabinet.

Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AUTOMATIC NOISE INVERTER CONTROL

Adjust on weakest station signal that will be received in that area.

Turn control fully counter clockwise then adjust in clockwise direction as far as possible without distortion or instability of picture. Check all channels for picture stability and make slight readjustment if necessary.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horiz. oscillator, it is necessary to remove the rear cover and supply power to set. adjust the horizontal hold slug (L25) until picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector buzz, adjust the ratio detector secondary (L24) located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for horizontal sweep protection. (See tube placement chart for location).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type knobs from front panel.
2. Remove 7 wood screws from back cover, remove back cover.
3. Remove speaker plug.
4. Remove 4 speaker nuts, remove speaker.
5. Remove 4 chassis bolts, remove chassis.

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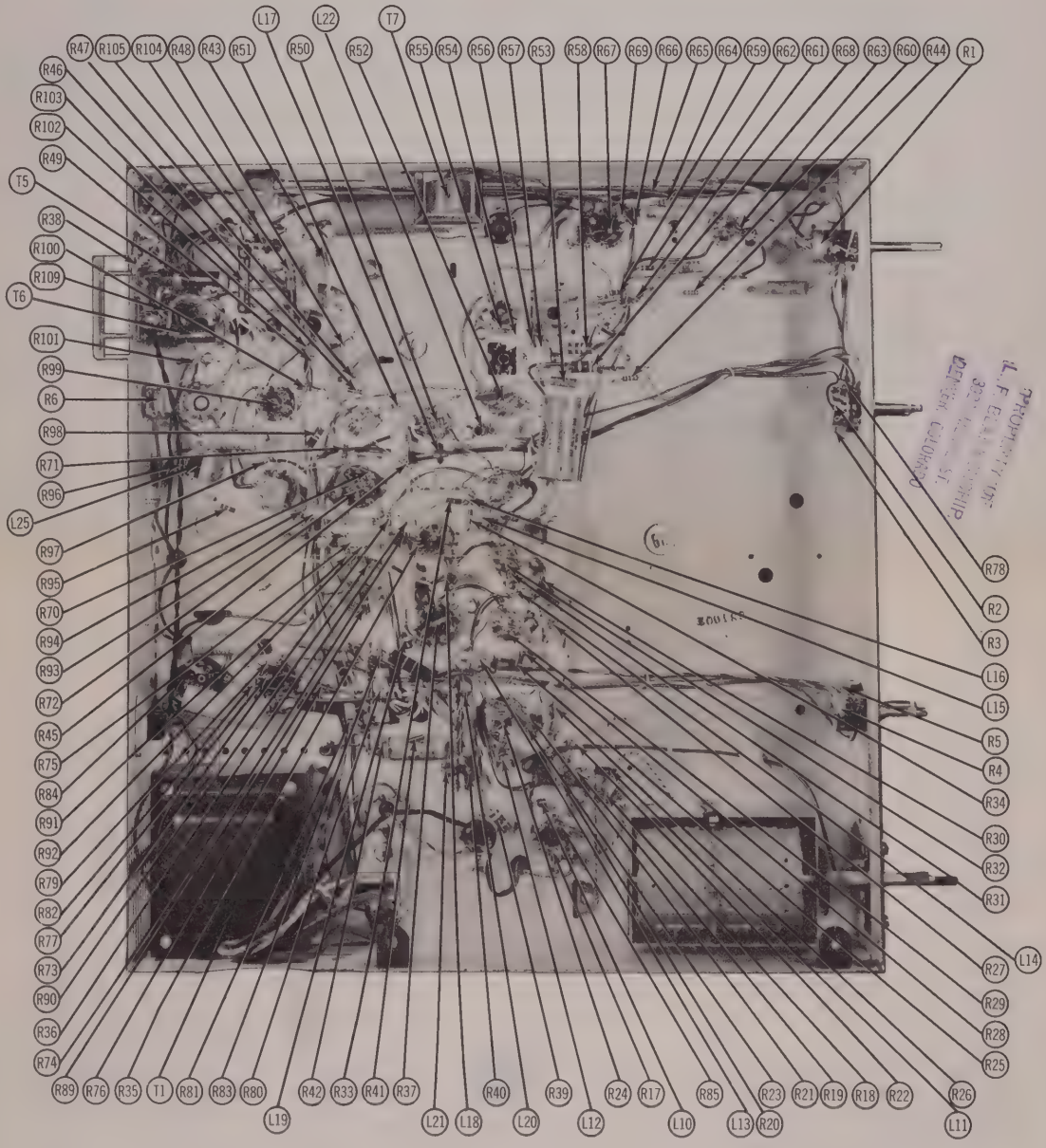

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PHOTOFACT* Folder

*TRADE MARK

RCA VICTOR MODELS 21-T-303, U, 21-T-313, U, 21-T-314, U, 21-T-315, U, 21-T-316, U, 21-T-322, U, 21-T-323, U, 21-T-324, U (Ch. KCS82, B)

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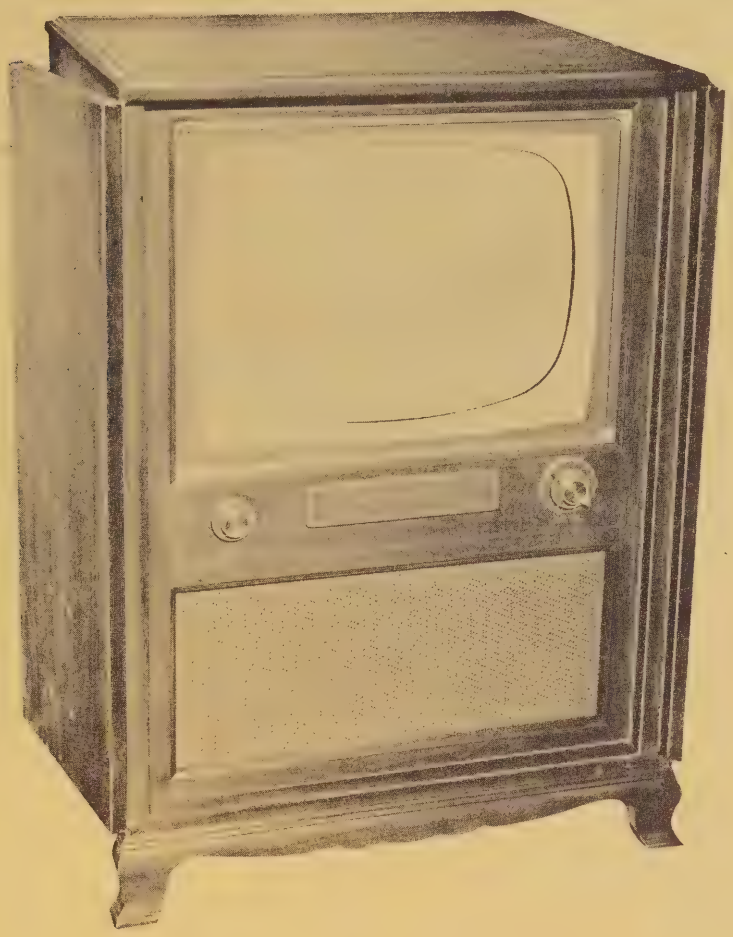

MODEL 21-T-324

RCA VICTOR MODELS 21-T-303, U, 21-T-313, U, 21-T-314, U, 21-T-315, U, 21-T-316, U, 21-T-322, U, 21-T-323, U, 21-T-324, U (Ch. KCS82, B)

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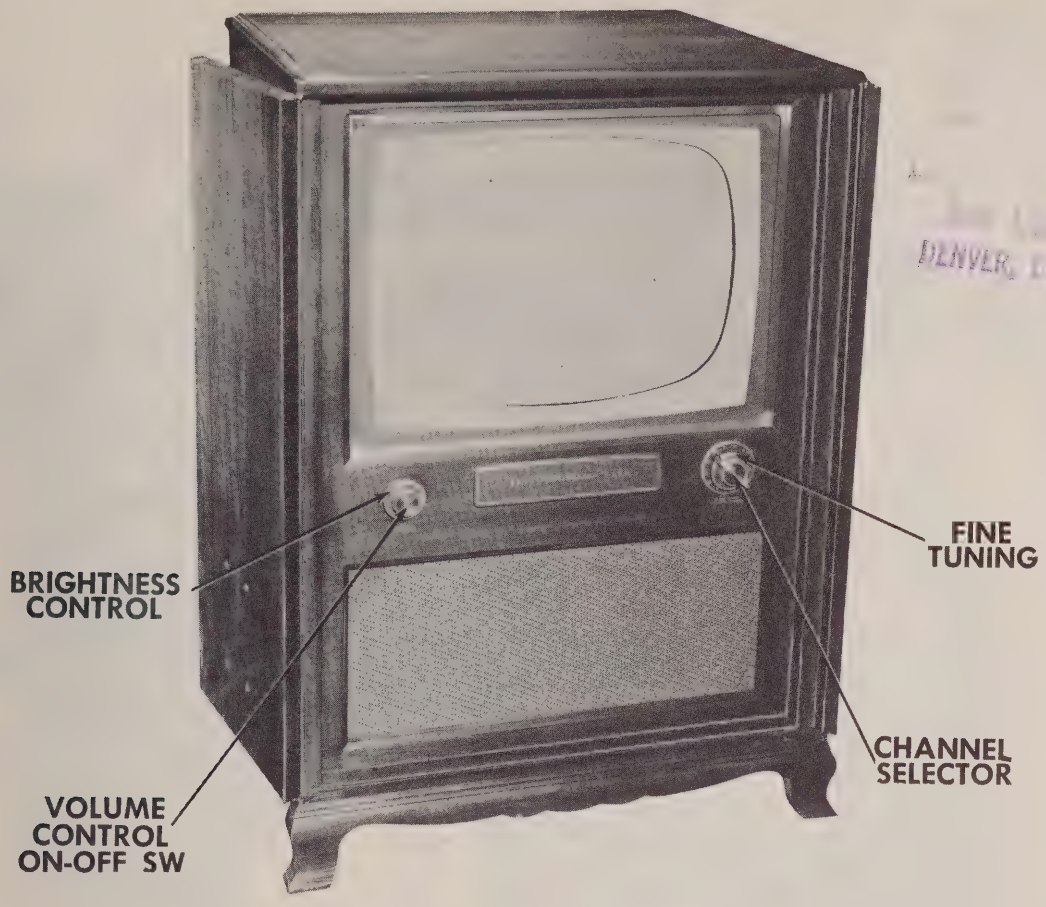

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RCA VICTOR MODEL 21-T-324

TRADE NAME	RCA Victor Models 21-T-303, U, 21-T-313, U, 21-T-314, U, 21-T-315, U, 21-T-316, U, 21-T-322, U, 21-T-323, U, 21-T-324, U (Ch. KCS82, KCS82B)
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N.J.
TYPE SET	Television Receiver
TUBES	Twenty-Two
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.98 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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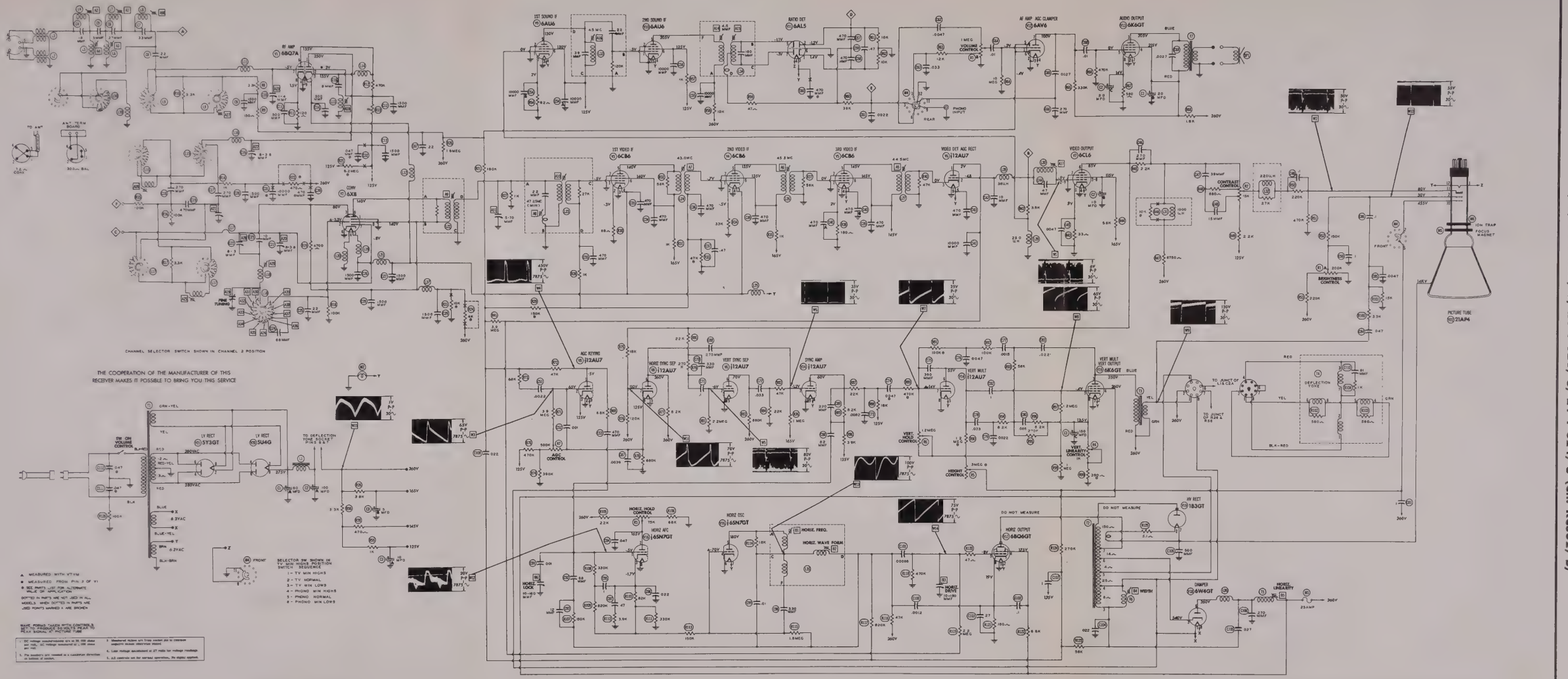
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 2 POSITION
SELECTOR SW. SHOWN IN TV MIN HIGHS POSITION
SWITCH SEQUENCE
1 - TV MIN HIGHS
2 - TV NORMAL
3 - TV MIN LOWS
4 - PHONO MIN HIGHS
5 - PHONO NORMAL
6 - PHONO MIN LOWS
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RCA VICTOR MODELS 21-T-303, U, 21-T-313, U, 21-T-314, U, 21-T-315, U, 21-T-316, U, 21-T-322, U, 21-T-323, U, 21-T-324, U (Ch. KCS82, B)

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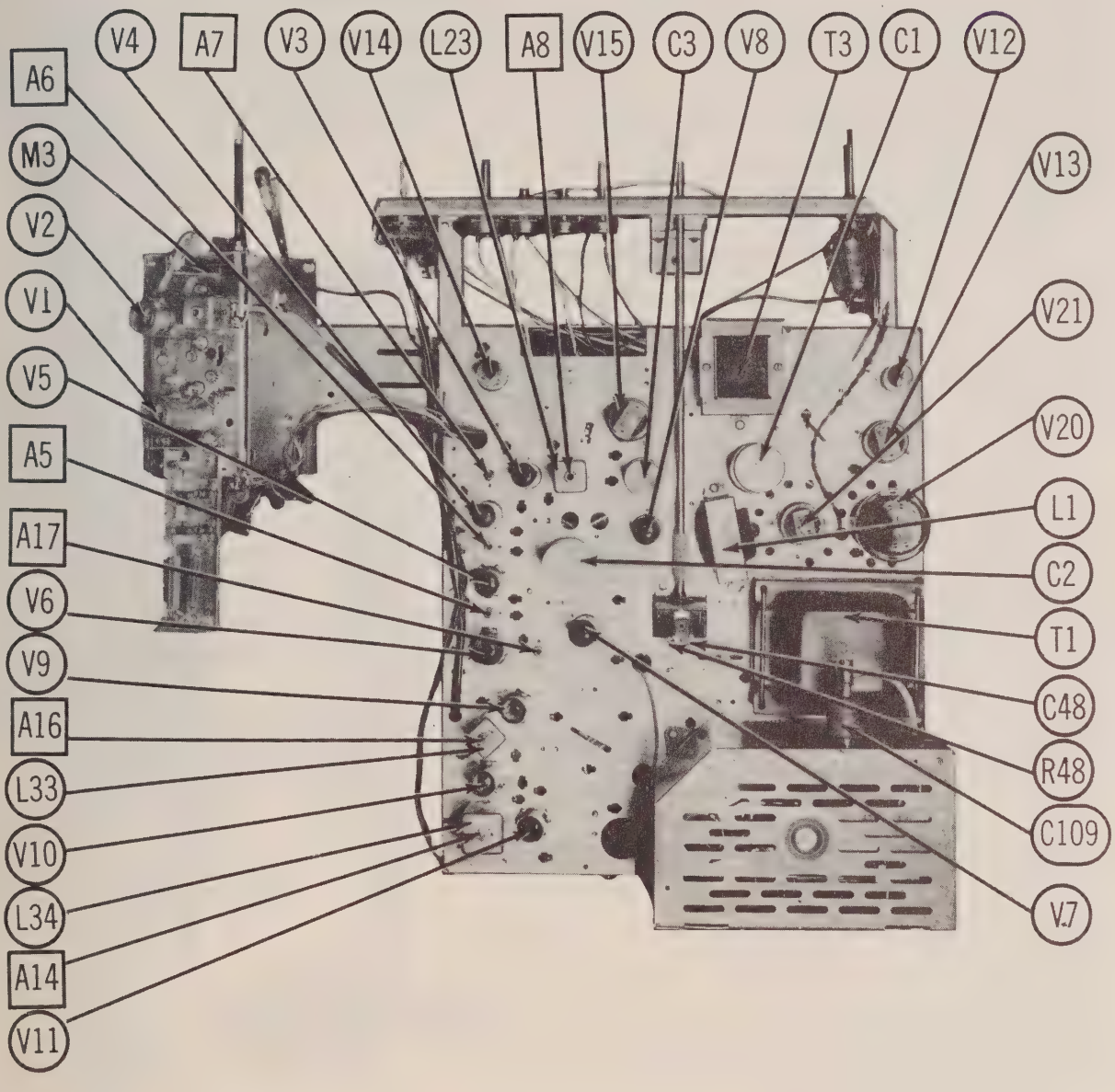
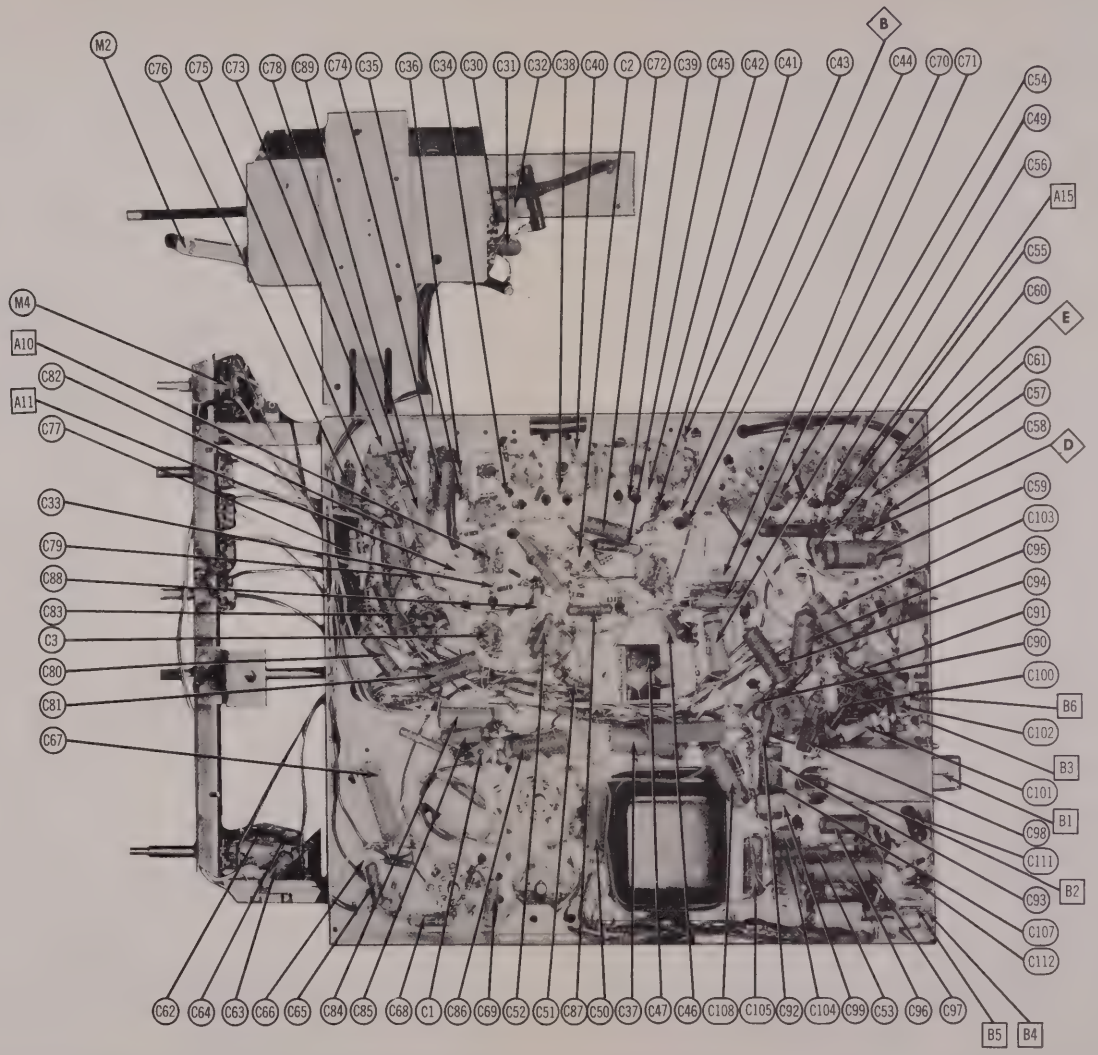


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal oscillator tube, V16.

ANTENNA MATCHING UNIT ALIGNMENT

The antenna matching unit is properly aligned at the factory. The RF unit is aligned with a particular antenna matching unit in place. If a new antenna unit is installed, the RF unit should be realigned. Alignment should not be attempted without the proper alignment facilities.
Disconnect the lead from the FM trap, L8, to the channel selector switch.
Use a short jumper to connect point (A) on the matching unit through a .001MFD capacitor to pin 1, grid, of 6CB6 (V4).
Remove 6CB6, V3, from its socket.
Cover of the matching unit must be in place during alignment.
Connect the ends of a 1000Ω potentiometer across a 7.5 volt battery capable of withstanding considerable current drain. Connect the positive terminal to chassis and the potentiometer arm to the junction of R28 and R29.
Set the potentiometer arm to obtain -5 volts at this point.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	Not Used.	45.75MC (400∿Mod)	Any	Vert. amp to point (B) Low side to chassis.	A1	Set oscilloscope gain to maximum and adjust A1 for MINIMUM 400∿ response.
2.	"	"	"	41.25MC (400∿Mod)	"	"	A2	Adjust for MINIMUM 400∿ response on scope.
3.	"	"	50MC (10MC Swp)	50MC 52MC 53MC	"	Vert. amp thru detector probe (Fig. 1) to point (A) Low side to chassis.	A3, A4	Remove the .001MFD capacitor (See instructions above) from point A and connect a 300Ω carbon resistor from point A to chassis using short leads. Adjust A3 and A4 to obtain response curve as in Fig. 2. Repeat steps 1, 2 and 3 until no further improvement is made. Remove the 300Ω resistor and the detector probe. Restore the connection between L8 and the channel switch. Replace V3.

VIDEO IF ALIGNMENT FOR RECEIVERS USING VHF TUNER KRK11-B

Connect bias supply as under Antenna Matching Unit Alignment and adjust for -5 volts.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to terminal "A" of L23. Low side to chassis.	Not Used.	44.5MC	Any not used locally.	Use VTVM. DC probe to point (B). Common to chassis.	A5	Adjust for maximum deflection. Attenuate generator to maintain not more than 3 Volt indication on VTVM.
5.	"	"	"	45.5MC	"	"	A6	"
6.	"	"	"	43.0MC	"	"	A7	"
7.	"	"	"	47.25MC	"	"	A8	Adjust for MINIMUM deflection.
8.	.0015MFD Ceramic Capacitor	High side thru .0015 MFD to point (C). Low side to tuner chassis. Use very short leads.	43MC (10MC Swp)	42.5MC 45.75MC 47.25MC	4	Vert. amp of scope thru detector (Fig. 1) to pin 5 (Plate) of 6CB6 (V3). Low side to chassis.	A9, A10, A11	Set AGC control fully clockwise. Preset A11 to minimum capacity. Clip 330Ω resistors across primaries of L26 and L27. Connect a 180Ω carbon resistor from plate to screen of 6CB6 (V3). Adjust A9 and A10 for maximum gain with 45.75MC at 70% response as in Fig 3. Attenuate generator to maintain .3Volt peak to peak response on scope. Adjust A11 to place 42.5MC at 70% on response curve.
9.	"	"	"	42.5MC 45.0MC 45.75MC 46.5MC	"	Vert. amp to point (B) Low side to chassis.		Disconnect the 180Ω and the two 330Ω resistors. Adjust output of generator for 3 Volts peak to peak on scope. Retouch A5, A6 and A7. for response similar to Fig. 4.

VIDEO IF ALIGNMENT FOR RECEIVERS USING UHF-VHF TUNER KRK12

Connect bias supply as under Antenna Matching Unit Alignment and adjust for -5 volts.
Turn the AGC control fully clockwise.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.0015MFD Ceramic Capacitor	High side to junction of 1N82 and the IF grid transformer. Low side to tuner chassis. Use short leads.	Not Used.	44.5MC	Any not used locally.	Use VTVM. DC probe to point (B) Common to chassis.	A5	Adjust for maximum deflection. Attenuate generator to maintain not more than 3 Volt indication on VTVM.
5.	"	"	"	45.5MC	"	"	A6	"
6.	"	"	"	43.0MC	"	"	A7	"
7.	"	"	"	47.25MC	"	"	A8	Adjust for MINIMUM deflection.
8.	"	"	43MC (10MC Swp)	43.25MC 45.75MC	5	Vert. amp of scope thru detector (Fig. 1) to pin 5 (Plate) of 6CB6 (V3).	A12, A10, A13, A11	Connect a 180Ω carbon resistor from plate to screen of V3. Clip 330Ω resistors across primaries of L26 and L27. Preset A11 at minimum capacity. Adjust A12 and A10 for maximum gain at 43.5MC with 45.75MC at 70% response. Adjust A11 for proper band width. Adjust A13 for maximum gain. Retouch A10, A11 and A12, if necessary, for response similar to Fig. 3.
9.	"	"	"	42.5MC 45.0MC 45.75MC 46.5MC	"	Vert. amp to point (B). Low side to chassis.		Disconnect the 180Ω and the two 330Ω resistors. Adjust output of generator for 3 Volts peak to peak on scope. Retouch A5, A6 and A7 for response similar to Fig. 4.

ALIGNMENT INSTRUCTIONS (CONT.)

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.001MFD	High side to pin 1 (grid) of 6AU6 (V9). Low side to chassis.	4.5MC (Unmod.)	Any not used locally.	DC probe to point (D). Common to chassis.	A14	Adjust for maximum deflection. Attenuate generator output for 6 volts at VTVM.
11.	"	"	"	"	DC probe to point (R). Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 10 and 11 making final adjustments with generator output set to produce 6 volts on VTVM at point (D).
12.	"	"	"	"	DC probe to point (D). Common to chassis.	A16	Adjust for maximum as in Step 10.

4.5MC TRAP ALIGNMENT

Short pin 1 (grid) of 6CB6 (V5) to chassis to prevent noise from masking the output indication.

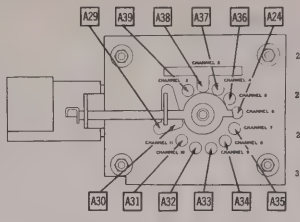
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	1000Ω Resistor	High side thru 1000Ω to pin 2 (grid) of V6A. Low side to chassis.	Not used	4.5MC (400%Mod)	Any	Vert. Amp. thru detector (Fig. 1) to pin 6 (plate) of 6CL6 (V7). Low side to chassis.	A17	Set generator output to approximately .5 volts. Adjust A17 for MIMIMUM 400% indication.

If receiver employs an RCA KRK11-B VHF tuner continue alignment with Step 14.
If receiver employs an RCA KRK12 UHF-VHF tuner proceed to Step 34.

KRK11-B TUNER ALIGNMENT

An RF unit which is operative and requires only minor touch-up adjustments will require no presetting of adjustments. Where complete alignment is necessary make the following pre-adjustments:
Set A23 so that the screw head projects approximately 3/8" above chassis. Set A21 1/4 turn from maximum capacity.
Disconnect the link from terminals "A" and "B" of L23 and terminate the link with a 33Ω carbon resistor.
Connect the potentiometer arm of the bias supply to terminal 3 on the tuner. Connect the positive lead to tuner chassis. Adjust bias supply to produce -3.5 volts at AGC terminal of tuner.
Tuner alignment as outlined below requires the use of a heterodyne frequency meter.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	.0015MFD	Remove 6X8 (V2) from socket and twist one end of small piece of wire around pin 7. Replace tube in socket and connect high side of generator to free end of wire. Low side to chassis.	Not used	43.5MC (400%Mod)	2	Vert. Amp. to point (P). Low side to chassis.	A18	Adjust for MINIMUM 400% indication on scope. Remove the wire lead from pin 7 of V2 and replace V2 tube and shield.
15.		RF input of heterodyne frequency meter to end of insulated wire inserted in hole in tuner provided for adjustment of A21.	"	Set freq. meter to 227MC	8	Not used	A19	Set fine tuning control 30 degrees clockwise from mechanical center of its range. Adjust for audible beat on frequency meter.
16.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	"	Vert. Amp. to point (P). Low side to chassis.	A20, A21 A22, A23	Set A9 to maximum counter clockwise rotation. Adjust A20, A21, A22 and A23 for response similar to Fig. 5.
17.		Connect frequency meter as in Step 15.	Not used	Freq. Meter to 189MC	6	Not used	A24	Adjust for audible beat on frequency meter.
18.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point (P). Low side to chassis.	A25, A26 A27	Adjust for response similar to Fig. 5.
19.	Turn off all generators, connect VTVM to point (P) of chassis and adjust A28 for -3.5 volts or maximum if less than 3.5 volts.							
20.	Repeat step 18.							
21.	Repeat step 15.							
22.	Repeat step 16.							
23.	If A20 was adjusted in step 22 recehck voltage at point (P) as in Step 19. If original setting of A28 was far off it may be necessary to alternately perform steps 15, 16 and step 19 several times before proper setting is obtained.							
24.		Connect frequency meter as in step 15.	Not used	Freq. meter to 257MC	13	Not used	A29	Adjust for audible beat on freq. meter. Slightly overshoot the adjustment a little more in same direction from original setting then adjust A19 to again obtain audible beat.
25.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (P). Low side to chassis.		Check for response similar to Fig. 5. If markers fall below 80% switch to channel 6 and readjust A20, A21, A22 and A23 as necessary.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
26.		Connect frequency meter as in Step 15.	Not used	Set freq. meter to 227MC	8	Not used		Check for audible beat on freq. meter. If necessary, adjust A19, overshoot the adjustment and correct by adjusting A29.



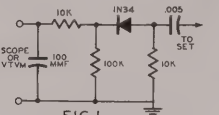


FIG. 1

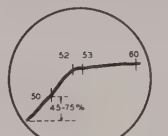


FIG. 2

FIG. 3

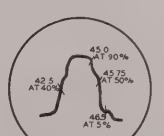


FIG. 4

FIG. 5

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
27.		Connect frequency meter as in step 15.	Not Used	Set freq. meter to 129MC	6	Not Used	A24	Adjust for audible beat on freq. meter.
28.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to point (P). Low side to chassis.		Check for response as in Fig. 5. If necessary retouch A25, A26 and A27.
29.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A9	Adjust A9 clockwise to point where further adjustment causes no change in response curve.
30.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to point (P). Low side to chassis.		Check for response as in Fig. 5 and for proper oscillator injection voltage at point (P). If excessive tilt occurs on channel 2, 3 and 4 adjust A23 on channel 2 overshoot the correction of tilt then adjust A27 on channel 6 for maximum amplitude of response between markers. This should produce flat response on low channels if other adjustments, especially A25 are correct.
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
31.	Check channels 7 thru 13 for proper response as in Step 25.							
32.		Connect frequency meter as in step 15.	Not used	Set freq. meter to 257MC	13	Not used		Check for audible beat on frequency meter. Adjust A19 if necessary.
33.		"	"	251MC	12	"	A30	Adjust for audible beat on frequency meter.
				245MC	11		A31	
				239MC	10		A32	
				233MC	9		A33	
				227MC	8		A34	
				221MC	7		A35	
				129MC	6		A24	
				123MC	5		A36	
				113MC	4		A37	
				107MC	3		A38	
				101MC	2		A39	

KRK12 TUNER VHF ALIGNMENT

It is necessary to meter the non-oscillating plate current of the 6S4 voltage control tube. This can be accomplished by use of an adaptor or similar arrangement. The circuit diagram for the adaptor is shown in Fig. 6.
Remove 6S4 from its socket and insert the adaptor plug. Plug 6S4 into adaptor.
Connect 0-50 MA meter to adaptor and turn the switch on.
Remove the tuner cover shield.
Set channel selector midway between channels to disable local oscillator. Some tubes may oscilliate even with the tuned circuits disengaged.
As a check, short circuit the spring contacts 12 and 13, nearest the tuner front, with a finger. (Contacts are at zero DC potential). If plate current rises keep finger on contacts while adjusting the oscillator voltage control for 28 MA indication on meter.
Replace tuner cover shield.
The oscilloscope used should have sensitivity of 1 mill watt per inch. If sensitivity is less a suitable preamplifier may be used with the scope.
A heterodyne frequency meter is used while making VHF oscillator adjustments.
To find oscillator frequency for any UHF or VHF channel add 45.75MC to the picture carrier frequency for that channel as listed in the frequency chart.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
34.	None	Couple loosely to antenna terminals	Set sweep to cover channel being aligned. See channel frequency chart.	Set alternately to video and sound carrier frequency of channel being aligned see chart.	2 thru 13	Vert. Amp. to point (G). Low side to chassis.	A40 A41 A42 A43 See Remarks	Ground the AGC line at tuner terminal board. Turn off the adaptor switch, removing plate voltage from oscillator. Adjust for response similar to Fig. 7. Each channel strip adjustment for an individual channel strip has a corresponding adjustment on all other VHF channel strips. Since these adjustments are identical in position and function they are indicated by the same "A" number in the interests of simplification. Adjustments A40, A41 and A42 for each channel strip are accessible through holes in top of tuner as the channel switch is turned to each channel. Adjustment A43 refers to coupling capacitor whose positioning affects bandwidth of response curve.
35.	Remove the ground placed on AGC line in above step. Turn the AGC control fully clockwise. Connect the potentiometer arm of the bias supply to the tuner AGC terminal. Connect the positive lead to the tuner case. Adjust for -5 volts at AGC terminal. Connect the potentiometer arm of a second bias supply to the junction of R28 and R29 and the positive lead to chassis. Adjust for -5 volts at potentiometer arm. Turn the 6S4 adaptor switch on to apply plate voltage to the oscillator. Connection of the heterodyne frequency meter for oscillator adjustment is made as follows: Insert the end of an insulated piece of wire into either of two holes next to the oscillator tube at the right top corner of the tuner. Use care so that wire does not touch any tuned circuits. Connect other end of wire to RF input of the frequency meter.							
36.		Connect frequency meter as above.	Not used	Freq. meter to 257MC	13	Not used	A44	Adjust for audible beat on freq. meter.
37.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (B). Low side to chassis.		Adjust A13 for maximum gain on scope. Adjust A42 for maximum gain and flat-topped curve. Recheck A13 for maximum gain at center of band.
38.		Connect frequency meter as in Step 35.	Not used	Freq. meter to oscillator frequency, channels 12 thru 2 See chart.	12 thru 2	Not used	A44 A42	Adjust A44 on each channel for audible beat on freq. meter. Connect sweep generator and scope as in step 37, set sweep and marker to proper frequencies for each channel and adjust A42, if necessary, for maximum gain and proper response curve.
39.	Direct	High side to point (H) Low side to chassis.	Not used	43.5MC (400%Mod)	Any	Vert. Amp. to point (B). Low side to chassis.	A45	Adjust for MINIMUM 400% indication on scope.

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ALIGNMENT INSTRUCTIONS (CONT.)

KRK12 TUNER UHF ALIGNMENT

Alignment of the UHF portion of the tuner should not be attempted unless the following test equipment is available, in addition to the usual VHF test equipment: A UHF sweep generator covering the frequency range of 470MC to 890MC.
A marker generator of crystal accuracy covering the same frequency range.
Leave 6S4 adaptor connected as under KRK12 Tuner VHF Alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
40.	10 db attenuator pad	Sweep generator thru attenuator to antenna terminals. Couple UHF marker generator loosely to antenna terminals.	Set sweep to cover channel being aligned. See chart. Use 10MC swp width	Set alternately to video and sound carrier frequency of channel being aligned. See chart.	14 thru 83	Vert. Amp. to point (G). Low side to chassis.	A46, A47 A48	Turn off the adaptor switch, removing plate voltage from oscillator. Ground the AGC line at the tuner terminal board. Adjust for maximum gain, symmetrical response curve centered about the pass band. See Fig. 8 for acceptable variations.
41.	Connect both bias supplies and adjust as under Tuner VHF Alignment. Remove the ground from the AGC line. Turn the adaptor switch on to apply plate voltage to the oscillator. Connect the VHF signal generator to point (G) using very short leads. Set generator to 45.75MC for remainder of tuner alignment.							
42.	10 db attenuator pad	Sweep generator thru attenuator to antenna terminals. Connect UHF marker generator to point (G), and tuner chassis.	Set sweep to cover channel being aligned. See chart. Use 10MC swp width	Set to video carrier frequency of channel being aligned. See chart.	14 thru 83	Vert. Amp. to point (B). Low side to chassis.	A49	Adjust A49 for channel strip being aligned until 45.75MC and video carrier marker coincide on response curve. Adjust A48 of channel strip being aligned for maximum gain with proper wave shape. Connect VTVM to point (G). Common to chassis. Set oscillator injection adjustment for reading on VTVM between .1 volt and .3 volt on all channel strips.

FM TRAP ADJUSTMENT

Tune in a TV station on which FM interference is noted and adjust A50 to minimize the interference. On some receivers A50 will tune into channels 6 or 5. Care must be used to avoid this possibility as reduced sensitivity on these channels will result.

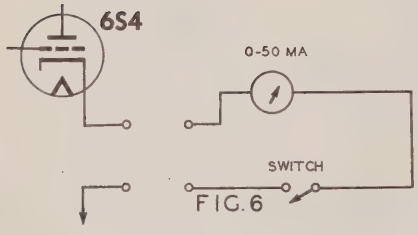


FIG. 6

FIG. 7

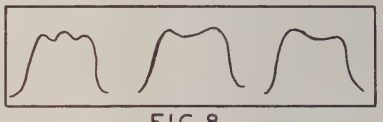
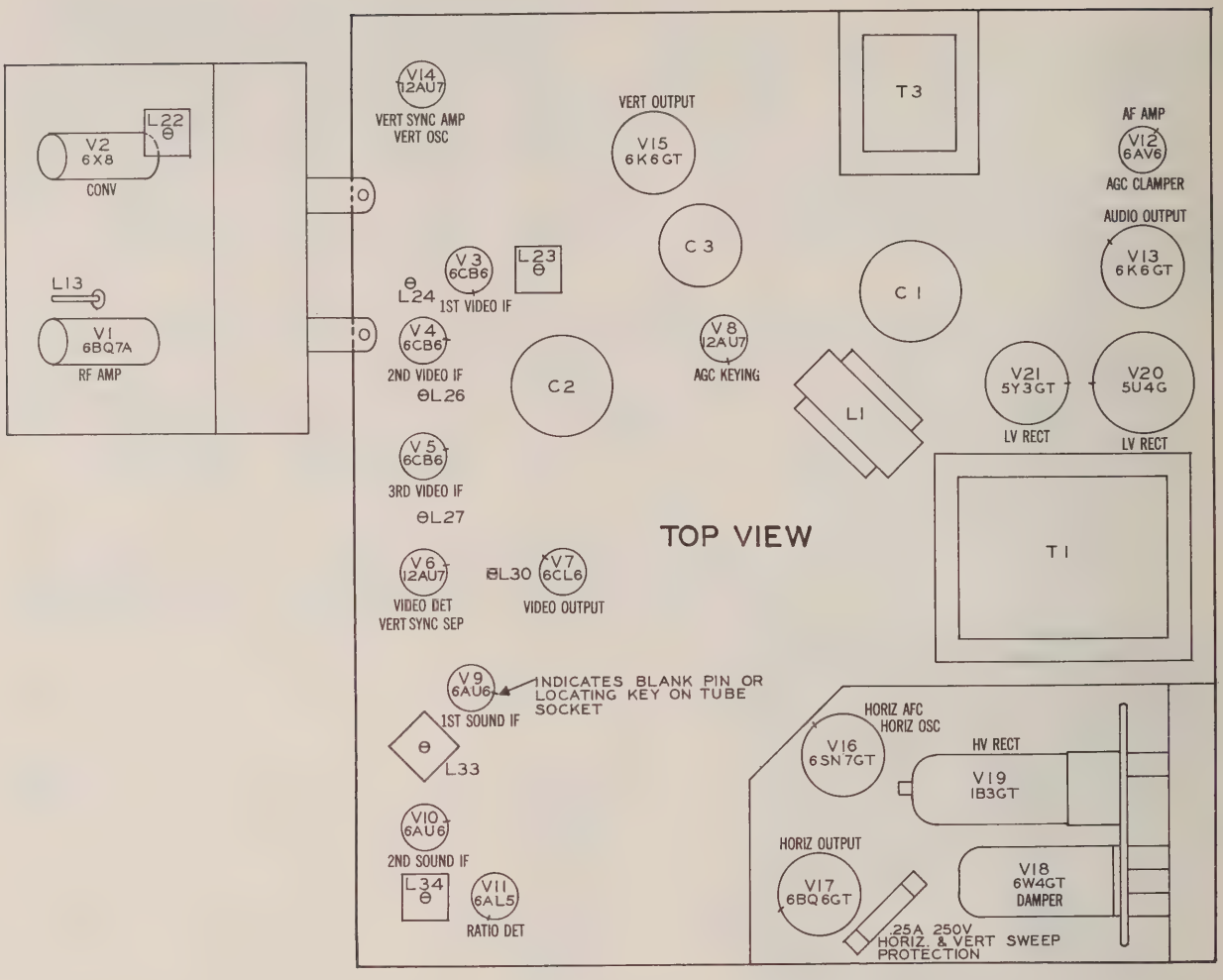


FIG. 8

TELEVISION CHANNEL FREQUENCIES

Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier
2	54-60	55.25	59.75	23	524-530	525.25	529.75	44	650-656	651.25	655.75	64	770-776	771.25	775.75
3	60-66	61.25	65.75	24	530-536	531.25	535.75	45	656-662	657.25	661.75	65	776-782	777.25	781.75
4	66-72	67.25	71.75	25	536-542	537.25	541.75	46	662-668	663.25	667.75	66	782-788	783.25	787.75
5	76-82	77.25	81.75	26	542-548	543.25	547.75	47	668-674	669.25	673.75	67	788-794	789.25	793.75
6	82-88	83.25	87.75	27	548-554	549.25	553.75	48	674-680	675.25	679.75	68	794-800	795.25	799.75
7	174-180	175.25	179.75	28	554-560	555.25	559.75	49	680-686	681.25	685.75	69	800-806	801.25	805.75
8	180-186	181.25	185.75	29	560-566	561.25	565.75	50	686-692	687.25	691.75	70	806-812	807.25	811.75
9	186-192	187.25	191.75	30	566-572	567.25	571.75	51	692-698	693.25	697.75	71	812-818	813.25	817.75
10	192-198	193.25	197.75	31	572-578	573.25	577.75	52	698-704	699.25	703.75	72	818-824	819.25	823.75
11	198-204	199.25	203.75	32	578-584	579.25	583.75	53	704-710	705.25	709.75	73	824-830	825.25	829.75
12	204-210	205.25	209.75	33	584-590	585.25	598.75	54	710-716	711.25	715.75	74	830-836	831.25	835.75
13	210-216	211.25	215.75	34	590-596	591.25	595.75	55	716-722	717.25	721.75	75	836-842	837.25	841.75
14	470-476	471.25	475.75	35	596-602	597.25	601.75	56	722-728	723.25	727.75	76	842-848	843.25	847.75
15	476-482	477.25	481.75	36	602-608	603.25	607.75	57	728-734	729.25	733.75	77	848-854	849.25	853.75
16	482-488	483.25	487.75	37	608-614	609.25	613.75	58	734-740	735.25	739.75	78	854-860	855.25	859.75
17	488-494	489.25	493.75	38	614-620	615.25	619.75	59	740-746	741.25	745.75	79	860-866	861.25	865.75
18	494-500	495.25	499.75	39	620-626	621.25	625.75	60	746-752	747.25	751.75	80	866-872	867.25	871.75
19	500-506	501.25	505.75	40	626-632	627.25	631.75	61	752-758	753.25	757.75	81	872-878	873.25	877.75
20	506-512	507.25	511.75	41	632-638	633.25	637.75	62	758-764	759.25	763.75	82	878-884	879.25	883.75
21	512-518	513.25	517.75	42	638-644	639.25	643.75	63	764-770	765.25	769.75	83	884-890	885.25	889.75
22	518-524	519.25	523.75	43	644-650	645.25	649.75								

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, V21

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V22
Has pic, no sound - V9, V10, V11, V12, V13
Overloaded picture - V8

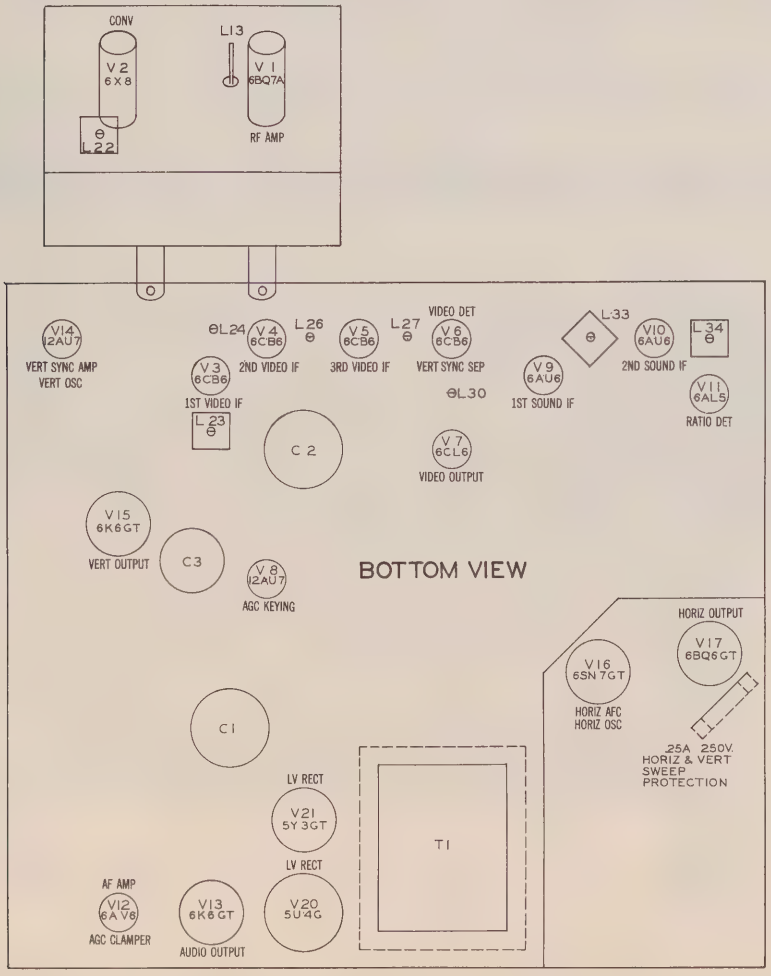
SYNC FAILURE
No vert. sync - V14
No horiz. sync - V14, V16
No vert. or horiz. sync - V6, V8, V14

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19, V22, Fuse (M1)
No vert. deflection - V14, V15
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17, V18, V19, V20, V21
Vert. off freq. - V14
Horiz. off freq. - V14, V16

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	†1.5KΩ	†8.2Meg	†8.7Meg	0Ω	.1Ω	†8.7Meg	280KΩ	120Ω	0Ω
V 2	6X8	0Ω	100KΩ	†8KΩ	0Ω	.1Ω	0Ω	100KΩ	†3.7KΩ	†3.7KΩ
V 3	6CB6	45KΩ	68Ω	0Ω	.1Ω	†4.8KΩ	†4.8KΩ	0Ω		
V 4	6CB6	47KΩ	33Ω	⟨1Ω	0Ω	†4.8KΩ	†4.8KΩ	0Ω		
V 5	6CB6	.2Ω	180Ω	.1Ω	0Ω	†3.8KΩ	†3.8KΩ	0Ω		
V 6	12AU7	100KΩ	3.9KΩ	.2Ω	.1Ω	.1Ω	†680KΩ	2.2Meg	0Ω	0Ω
V 7	6CL6	33Ω	3.9KΩ	†9.4KΩ	0Ω	.1Ω	†6.8KΩ	0Ω	†9.4KΩ	3.9KΩ
V 8	12AU7	1.3Meg	4.5Meg	†3.8KΩ	0Ω	0Ω	†8.2KΩ	†27KΩ	360KΩ	.1Ω
V 9	6AU6	7Ω	0Ω	0Ω	.1Ω	†3.8KΩ	†4.3KΩ	82Ω		
V 10	6AU6	120KΩ	0Ω	0Ω	.1Ω	†10KΩ	†5.3KΩ	0Ω		
V 11	6AL5	10KΩ	10KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 12	6AV6	10Meg	0Ω	0Ω	.1Ω	280KΩ	280KΩ	†330KΩ		
V 13	6K6GT	INF	0Ω	†2.2KΩ	†1.8KΩ	470KΩ	INF	.1Ω	560Ω	
V 14	12AU7	†13KΩ	70KΩ	0Ω	.1Ω	.1Ω	▲3.1Meg	1.5Meg	0Ω	0Ω
V 15	6K6GT	INF	.1Ω	†570Ω	†41Ω	2.3Meg	1.1Meg	0Ω	630Ω	
V 16	6SN7GT	1.5Meg	†45KΩ	380KΩ	480KΩ	†47KΩ	0Ω	.1Ω	0Ω	
V 17	6BQ7GT	INF	.1Ω	INF	†6.8KΩ	460KΩ	100KΩ	0Ω	180Ω	Top Cap ▲14Ω
V 18	6W4GT	INF	INF	1 Meg	INF	†62Ω	INF	▲29Ω	▲29Ω	
V 19	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap ▲164Ω
V 20	5U4G	INF	11KΩ	INF	12Ω	INF	13Ω	INF	11KΩ	
V 21	5Y3GT	INF	11KΩ	INF	13Ω	INF	12Ω	INF	11KΩ	
V 22	21AP4	0Ω	190KΩ	Pin 10 ▲350KΩ	Pin 11 160KΩ	Pin 12 .1Ω				

▲ MEASURED FROM PIN 3 OF V18 .
† MEASURED FROM PIN 2 OF V21.



TUBE PLACEMENT CHART

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3924 MERGE ST.
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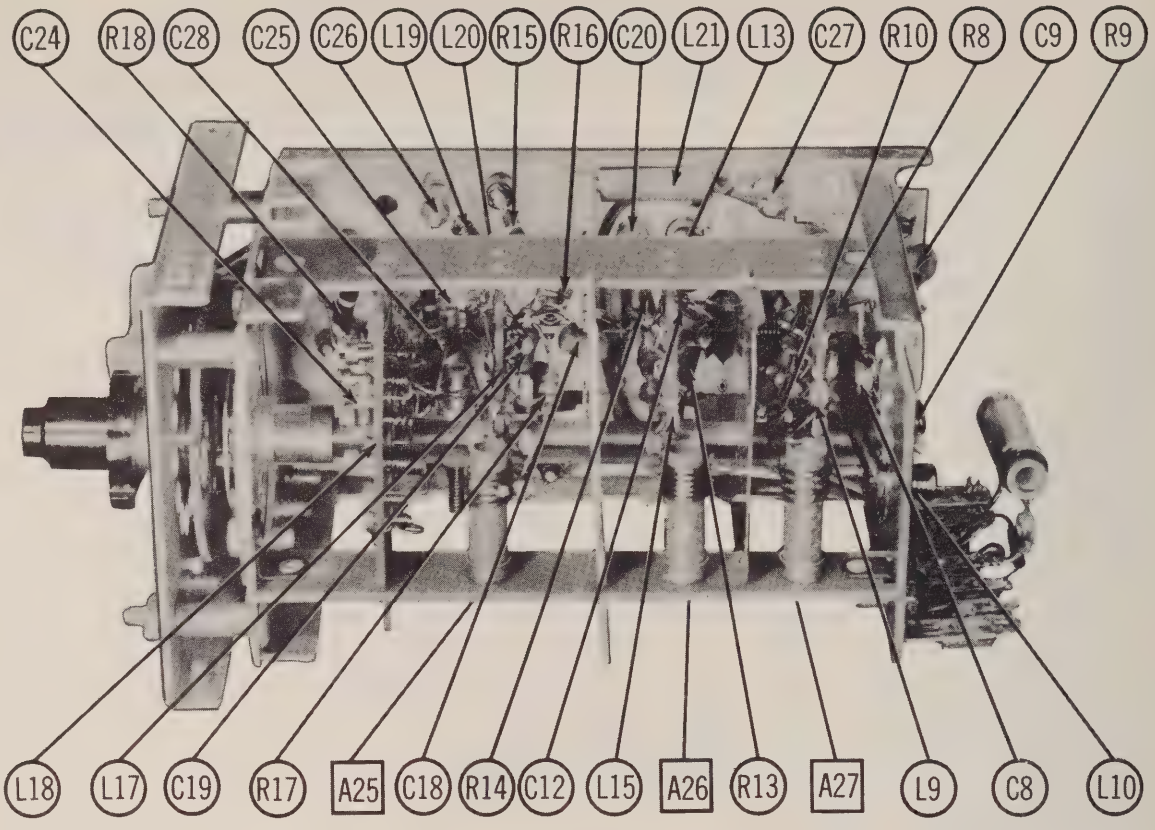
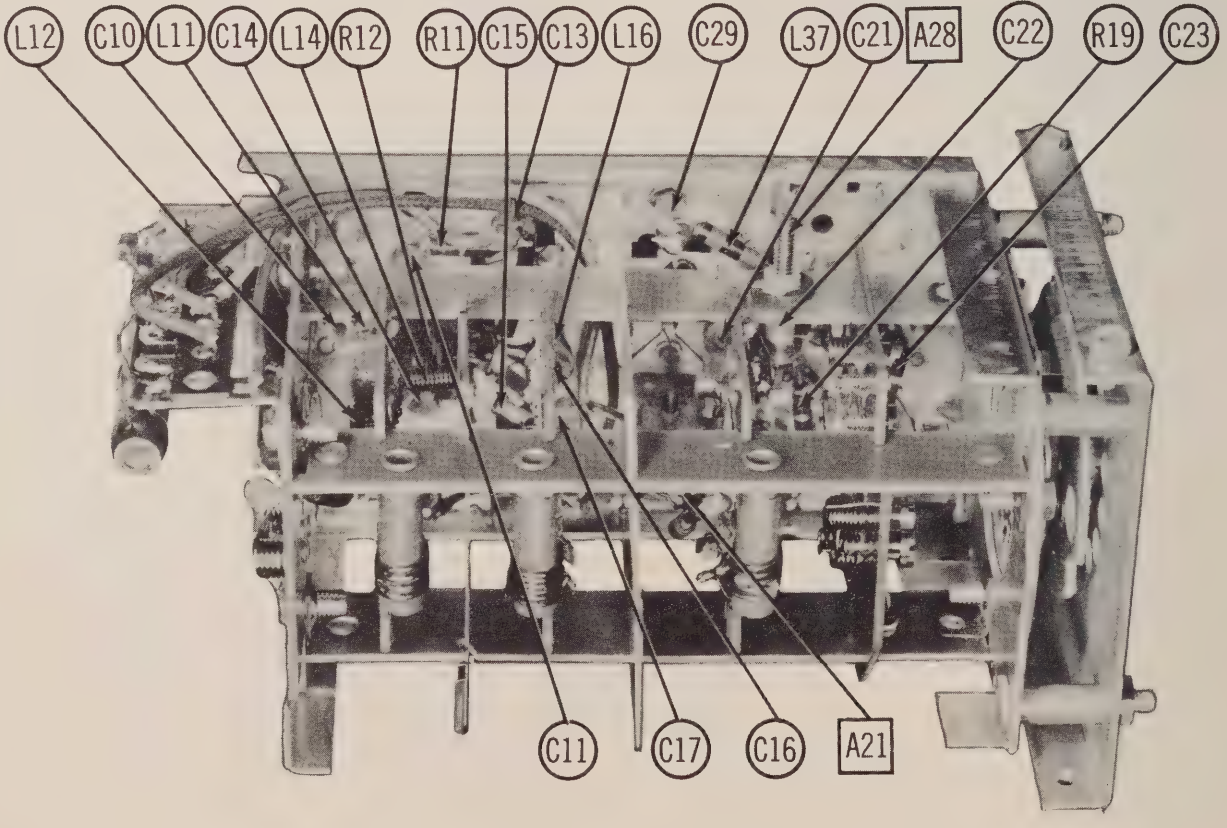
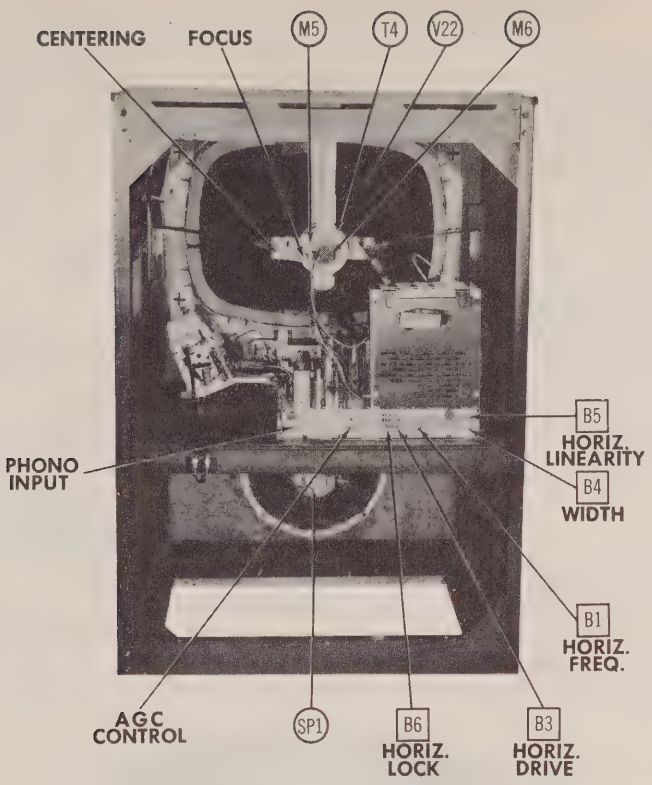


RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL FREQUENCY ADJUSTMENT

Turn the set on and tune in a TV station, preferably a test pattern.
If the picture cannot be synchronized horizontally with the horizontal hold control, adjust the horizontal frequency slug (B1) until picture will synchronize. If picture still will not synchronize adjust the horizontal waveform slug (B2) several turns out of the coil and readjust B1 to synchronize the picture.
If picture width or linearity is incorrect adjust the horizontal drive trimmer (B3) the width control slug (B4) and the horizontal linearity control slug (B5) for proper results.

HORIZONTAL WAVEFORM ADJUSTMENT

The horizontal waveform adjustment is made at the factory and normally will require no readjustment.
B1 and B2 are adjusted simultaneously while watching the picture.
Set the horizontal hold control fully clockwise. Turn B1 until picture falls out of sync and 4 or 4 diagonal black bars sloping down to the right appear on the screen.
Turn B2 clockwise, at the same time adjusting B1 to maintain 3 or 4 bars on screen.
Continue adjusting B1 and B2 in that manner until the oscillator begins to motorboat, then adjust B2 counter clockwise until motorboating stops. To check adjustment turn B1 until picture synchronizes, then reverse the direction of core rotation until the picture falls out of sync with diagonal bars sloping down to the right.
Continue to turn B1 in same direction. No more than 3 or 4 bars should appear on screen. Instead the horizontal oscillator should start to motorboat. Retouch B2 until this condition is obtained.
To observe the horizontal waveform connect the low capacity probe of an oscilloscope to terminal C of L35.
Turn the horizontal hold 1/4 turn from counter clockwise so that picture is in sync.
The waveform on the scope should appear as in Fig. 9. Adjust B2 for broad and narrow peaks of equal height as in Fig. 9.
If necessary while adjusting B2 keep the picture in sync with the horizontal hold control.

HORIZONTAL LOCKING RANGE ADJUSTMENT

With the horizontal hold control in full counter clockwise position momentarily interrupt the signal by switching off channel and back. If picture remains in sync turn B1 slightly and again switch off channel, repeating until picture loses sync with diagonal lines sloping down to the left. Slowly turn the horizontal hold control clockwise and note the least number of bars obtained just before the picture pulls into sync.
If the number is more than 3 adjust the horizontal locking trimmer (B6) slightly clockwise. If the number is less than 2 adjust B6 counter clockwise. Re check as above for the least number of bars and readjust B6, if necessary, until 2 or 3 bars are present.
Turn the horizontal hold control fully clockwise and adjust B1 until the diagonal bar sloping down to the right appears on the screen, then reverse direction of adjustment of B1 until the diagonal bar just disappears, leaving the picture in synchronization.

AGC CONTROL ADJUSTMENT

Connect an oscilloscope to pin 6 (plate) of 6CL6 (V7). Turn the AGC control fully counter clockwise. Tune in a strong TV signal and adjust the scope to see the video waveform. Turn the AGC control clockwise until the sync tips begin to be compressed, then counter clockwise just enough to remove the compression.

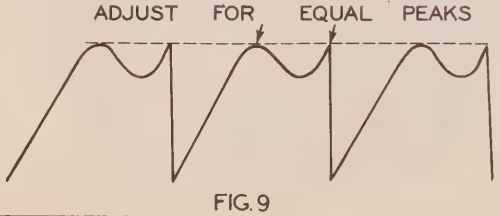


FIG. 9

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP (Fig. 1)

Check yoke. Check solder connections in yoke, yoke plug and socket.

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18, V20 and V21

Check amplitude of waveform W14

If Insufficient	If Sufficient
Check components of V16. Check C101 and R118.	Check components V17 and V18 especially R120, R121, R122, C102 and C103

DRIVE LINES

Check by substitution V16 and V17. Check C101 and B3 (Horizontal drive control).

COMPRESSED AT LEFT SIDE

Substitute V17 and V18.

Check waveform W14:

If Unsatisfactory	If Satisfactory
Check compling network between V16 and V17.	Check T2 and T5. Check associated components.

FOLDS

Substitute V18. Check C104, C105 and C106. Check associated components.

VERTICAL

LOSS OF SWEEP

Check V14 and V15.

Check waveform W8:

If Unsatisfactory	If Satisfactory
Check components of vertical oscillator and coupling capacitor C82.	Check R6, R97, R98, R99, T3 and associated components.

INSUFFICIENT SWEEP

Substitute V14 and V15. Check associated components, especially C81 for leakage and C74 for open.

COMPRESSED AT BOTTOM

Substitute V14 and V15. Check C3C for open and C78 for leakage.

COMPRESSED AT TOP

Substitute V14 and V15. Check coupling network between V14 and V15.

COMPRESSED AT TOP, STRETCHED AT BOTTOM

Check C79 for leakage. Check V16 and yoke components.

FOLDS

Substitute V15. Check T4 and components.

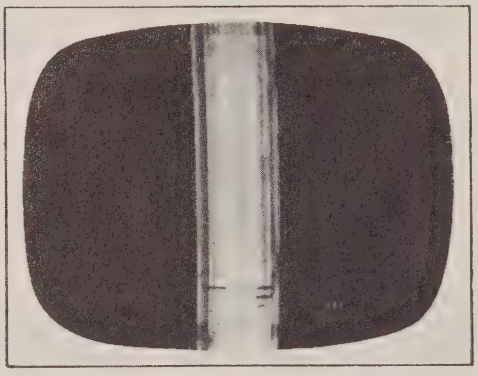


Fig. 1. LOSS OF SWEEP (See Horizontal Sweep).

SYNC

HORIZONTAL

LOSS OF SYNC

Substitute V6, V13, and V16,

Check waveform W12:

If Unsatisfactory,	If Satisfactory
Check components of V6B and V14A. Check coupling from V14A to V16.	Check V16 components particularly C95 for leakage and C97 for open.

CRITICAL SYNC

Check C96 for open.

PULLING PICTURE

Check C90 and C94 for open. Fig. 2 results from C97 being open.

VERTICAL

LOSS OF SYNC

Substitute V6, V14 and V15,

Check waveform W7:

If Unsatisfactory	If Satisfactory
Check components of V6 and V14. Check C74 and C75 for leakage.	Check components of V14 plate and cathode circuits.

CRITICAL SYNC

Substitute V6, V14 and V15. Check associated components for change in values.

TRIGGERING

Substitute V14. Check filament lead dressing around grid circuit.

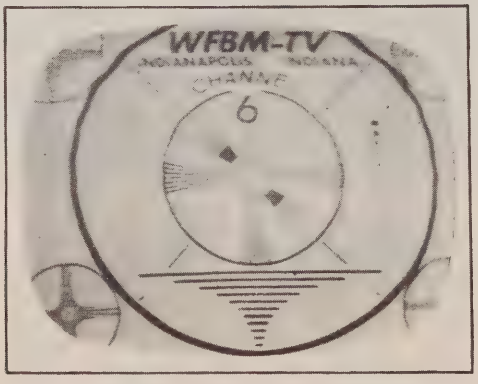


Fig. 2. PULLING PICTURE (See Horizontal Sync).

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	6X8	6X8	9AK	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector-Vert. Sync Sep.	12AU7	12AU7	9A	
V7	Video Output	6CL6	6CL6		
V8	AGC Keying-Horiz. Sync Sep.	12AU7	12AU7	9A	
V9	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V10	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	AF Amplifier-AGC Clamper	6AV6	6AV6	7BT	
V13	Audio Output	6K6GT	6K6GT	7S	
V14	Vert. Sync Amp.-Vert. Oscillator	12AU7	12AU7	9A	
V15	Vert. Output	6K6GT	6K6GT	7S	
V16	Horiz. AFC-Horiz. Oscillator	6SN7GT	6SN7GT	8BD	
V17	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V18	Damper	6W4GT	6W4G T	4CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	
V21	LV Rectifier	5Y3GT	5Y3GT	5T	

PROPERTY OF
L. F. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: RCA Victor PART No.	SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V22	21AP4	21AP4		12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	400	77644	AFH2-63		CO36		FP245.3	TVL-2673	
B	▲20	400								
C2A	▲100	400	76970	AFH3-40		C152		FP431.4	TVL-3672	
B	■10	350		PRS50/25						
C	▲20	50								
C3A	■10	350	75218	AFH3-112		CO74		FP387.1	TVL-3638	
B	▲5	350								
C	150	50								
C4	18		54207				NP0K-180			
C5	5		93056	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C6	27		70935				NP0K-270			
C7	33		76739	SI33NP0	TCZ-33		NP0K-330	ZT-5433	5TCC-Q33	
C8	22		76557	SI22	D6-220		GP1K-220	UC-5422	5GA-Q22	
C9	1500		73748	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C10	1-4		76532		829-4					
C11	1500		73748	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C12	1500		73748	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C13	1500		75166	CS-1B-0015	S1-152				501C-1500	
C14	1500		73748	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C15	8		70597				NP0K-080			
C16	.8-3.8									
C17	270		75199	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C18	270		75199	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C19	470			SI470	D6-471		GP2K-471	UC-5347	5GA-T47	
C20	1500		75166	CS-1B-0015	S1-152				501C-1500	
C21	.8-3.8		75184							
C22	.8-3		77151		829-3			CT565A		
C23	10		55326	SI10N080			N080-331-100			
C24	.68		71504		TCZ-.68		NP0K-R68			
C25	22		76558	SI22N750	TCN-22		N750K-220		5TCU-Q22	
C26	1500		75166	CS-1B-0015	S1-152				501C-1500	
C27	1500		75166	CS-1B-0015	S1-152				501C-1500	
C28	1500		76510	SI1500	D6-152	TM5D15	GP2L-152	UC-5215	5HK-D15	
C29	1500		75166	CS-1B-0015	S1-152				501C-1500	
C30	470		77293	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	Note 1
C31	10000		73960	BPD-01	DD-1032	TM5S1	811-01	DC-511	5HK-S1	Note 1
C32	.047	400	73553	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	Note 1
C33	470		77293	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C34	470		77293	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C35	470		77293	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C36	470		77293	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C37	.47	200	73787	P288-47		PJ2P5		PT405	2TM-P47	
C38	470		77293	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C39	470		77293	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C40A	470		77672	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
B	470			BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C41	10000		73960	BPD-01	DD-1032	TM5S1	811-01	DC-511	5HK-S1	
C42	10		33098	SI10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C43	470		77293	BPD-00047	DD-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C44	47				TCZ-47		NP0-333-470		5TCC-Q47	
C45	.0047	600	73920	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C46	270	500	39638	I469-0003		5R5T3		MCB241	MS-33	
C47	39		73664		TCN-39		N750K-390			
C48	15		39044		TCN-15		N750K-150		5TCU-Q15	
C49	.1	200	73784	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C50	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C51	.0022	600	73595	P688-0022	D6-222	PTE6022	GP2-333-222	PT6222	6TM-D22	
C52	.001	600	75643	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C53	470	1500	77673							

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C54A	10000		78691	BPD-01	DD-3-103	TM5D81	81-01	DC-511	5HK-221	
B	10000			BPD-01			81-01	DC-511	5HK-S1	
C55	10000		73960	BPD-01	DD-1032	TM5S1	81-01	DC-511	5HK-S1	
C56	10000		73960	BPD-01	DD-1032	TM5S1	81-01	DC-511	5HK-S1	
C57	470	500	39044	1467-0005	DD-471	5WS7S	GP2K-471	MC245	MB-35	
C58	470	500	39044	1467-0005	DD-471	5WS7S	GP2K-471	MC245	MB-35	
C59	.47	200	73787	P288-47		P12P5		PT405	2TM-P47	
C60	470		77293	BPD-00047	DD-471	TM5T5	GP3K-471	UC-5347	3GA-T47	Note 3
C61	.0022	600	73595	P688-0022	DD-222	PTE6D22		PT6222	6TM-D22	
C62	.0047	600	73920	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C63	.033	200	73552	P488-033				PT4133	4TM-S33	
C64	.01	400	73561	P488-01	D6-103	PTE4S1	GP2-333-105	PT411	4TM-S1	
C65	.0027	600	73599	P688-003	D6-272	PTE6D3	GP2-333-272	PT623	6TM-D3	
C66	270		47817		TCM-270		N750L-271			
C67	.22	200	73794	P488-22		PTE4D22		PT4025	2TM-P23	
C68	.01	400	73561	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C69	.0027	1000	73818	P1088-003		PTE10D3		PT1623	MB-D3	
C70	330	500	39040	1469-00035						
C71	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C72	.033	400	73552	P488-033		PTE4S3		PT4133	6TM-S3	
C73	.0082	400	73808							
C74	.0047	600	73920	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	Note 3
C75	330	1000	73094							
C76	.0047	600	73920	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C77	.0015	1000	77123							
C78	.033	600	73596	P688-033				PT6133		
C79	.0022	600	73595							
C80	.068	200	73792							
C81	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C82	.1	600	73557	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C83	.022	600	73798	P688-022		PTE6S22		PT6122	6TM-S22	
C84	.047	600	73592	P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C85	.0047	600	73920	P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C86	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C87	.0039	600	73796	P688-004	D6-402	PTE6D4	GP2-333-402	PT624	6TM-D4	
C88	270	1000	76579							
C89	220	500	39036							
C90	82	1000	76474							
C91	.001	600	75643	P688-001	D6-102	PTE6D1	GP3L-102	PT621	6TM-D1	
C92	68	1000	76475							
C93	12		33380		TCN-12		N750K-120			
C94	.047	400	73553	P488-047	DF-503	PTE4S47		PT4147	4TM-S47	
C95	.1	400	73551	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C96	.022	400	73562	P488-022	DD-203	PTE4S22		PT4122	4TM-S22	
C97	.47	200	73787	P288-47		P12P5		PT405	2TM-P47	
C98	330	1000	76476							
C99	.01	600	73594							
C100	.0012	600	76965							
C101	.00068	600	76479							
C102	.1	600	73557	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C103	.27	200	73786							
C104	.022	1000	73810	P1088-022		PTE10S22		PT10122	MB-S22	
C105	.027	1000	73811							
C106	270	1000	76579							
C107	.1	600	73557	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C108	.022	1000	73810	P1088-022		PTE10S22		PT10122	MB-S22	
C109	500	20000	76461	HV11	TV4-502		413-501		20DK-T5	
C110	91	2000								
C111	.047	400		489ZX-05		P24S5		PT4147	4TM-S47	Note 4
C112	.047	400		489ZX-05		P24S5		PT4147	4TM-S47	Note 4

Note 1. Not used in Ch. KC882B.
Note 2. Not used in all Models.
Note 3. Some Models use .001MFD in this application (part #75643).
Note 4. Some Models use .01MFD in this application (part #73594).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	200KΩ	½	77655	QJ-447 *	RTV-406		UP254L	Brightness-Panel
B	1MEg	½					UR16-T25	† Volume-tapped ⑤ 200KΩ-rear
C	Switch						US-26	Attach to R1B
R2	15KΩ	½	78445	QJ3-1RXX				Contrast-tapped ④ 4875Ω and 10KΩ
								Horiz. Hold
R3A	75KΩ	½	77639	QJ1-125	AG-47-S	AB-3S	U-41	Attach to R3A
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Vert. Linearity
R4A	100KΩ	½	77643	QJ1-108	AG-5-S	AB-4S	U-4	Attach to R4A
B	Shaft		Not Req.	SQ	KS8-3	AK-1	Not Req.	Height-see note
R5A	3Meg	½	77924	QJ1-140	AG-85-S	AB-8S	U-59	Height-see note
B	Shaft		Not Req.	SQ	KS8-3	AK-1	Not Req.	Attach to R5A
R6A	1.2Meg	½	77642	QJ1-138	AG-83-S	AB-7S	U-155	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R6A
R7A	500KΩ	½	76975	QJ1-133	AG-58-S	AB-5S	SU-50	AGC
B	Shaft		Not Req.	Not Req.	KS3-1/4	AK-1	Not Req.	Attach to R7A

* CONCENTRIKIT EQUIVALENT- KIT K-2, BASE ELEMENTS & SHAFTS B11-129 & P1-200 (Panel) B13-137X & R1-216 (Rear) & SWITCH 76-1
† Universal Replacement- (Mallory exact duplicate part #UR13908)
Note . Some Models use a 2.5Meg control in this application.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	NOTES
R8	330Ω	½	503233	BTS-3300	
R9	150Ω	½	503115	BTS-150	
R10	3300Ω	½	503233	BTS-3300	
R11	120Ω	½	503112	BTS-120	
R12	470KΩ	½	503447		
R13	1000Ω	½	503210	BTS-1000	
R14	1000Ω	½	503210	BTS-1000	
R15	100KΩ	½	503410		
R16	100KΩ	½	503410	BTS-100K	
R17	3300Ω	½	503233	BTS-3300	
R18	100KΩ	½	503410	BTS-100K	
R19	4700Ω	½	503247	BTS-4700	
R20	1.5Meg 5%	½	U769	BTS-1.5Meg 5%	
R21	180KΩ 5%	½	502418	BTS-180K 5%	
R22	470KΩ	½	503147	BTS-470	Note 1
R23	10KΩ	5	77639	1 3/4A-10K	Note 1
R24	4000Ω	7	77638	1 3/4A-4000	Note 1
R25	8.3Meg	½	503582	BTS-8.3Meg	Note 1
R26	3900Ω	7	77671		

RESISTORS (CONT.)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: RCA Victor PART No.	IRC PART No.	NOTES
R27	1000Ω	½	503210	BTS-1000	
R28	1000Ω	½	503210	BTS-1000	
R29	150KΩ 5%	1	512415	BTA-150K 5%	Note 3
R30	68Ω 5%	½	34763	BTS-68 5%	
R31	1000Ω	½	503210	BTS-1000	
R32	58KΩ 5%	½	502356		
R33	47KΩ	½	503347	BTS-47K	Note 2
R34	33Ω 5%	½	39789	BTS-33 5%	
R35	1000Ω	½	503210	BTS-1000	
R36	1Meg	½	503510	BTS-1Meg	
R37	35KΩ 5%	½	502356		
R38	180Ω 5%	½	502118	BTS-180 5%	
R39	470Ω	½	503147	BTS-470	
R40	47KΩ	½	503347		
R41	3.9Meg	½	503539	BTS-3.9Meg	
R42	3900Ω 5%	½	502339	BTS-3900 5%	
R43	33Ω	½	503033	BTS-33	
R44	5600Ω	1	513256	BTA-5600	
R45	2200Ω	2	523222	BTB-2200	
R46	10KΩ 5%	½	502310	BTS-10K 5%	Note 8
R47	675Ω	10	76642		
R48	68Ω	½	503168	BTS-680	
R49	2200Ω	½	503222	BTS-2200	
R50	220KΩ	½	503422	BTS-220K	
R51	470KΩ	½	503447	BTS-470K	
R52	150KΩ	½	503415	BTS-150K	
R53	220KΩ	½	503422	BTS-220K	
R54	82Ω	½	503083	BTS-82	
R55	1000Ω	1	513210	BTA-1000	
R56	3300Ω	7	77670		
R57	1000Ω	½	503210	BTS-1000	
R58	10KΩ	1	513310	BTA-10K	
R59	47Ω	½	503047	BTS-47	
R60	39KΩ	½	503339	BTS-39K	
R61	10KΩ 5%	½	502310	BTS-10K 5%	
R62	10KΩ 5%	1	502310	BTS-10K 5%	
R63	12KΩ	½	503312	BTS-12K	
R64	10Meg	½	503610	BTS-10Meg	
R65	330KΩ	½	503433	BTS-330	
R66	470KΩ	½	503447	BTS-470K	
R67	560Ω	1	513156	BTA-560	
R68	1800Ω	2	522218	BTB-1800	
R69	5600Ω	1	513256	BTA-5600	
R70	470KΩ	1	503447	BTS-470K	
R71	3.9Meg	½	503539	BTS-3.9Meg	
R72	47KΩ	½	503347	BTS-47K	
R73	68KΩ	½	503368	BTS-68K	
R74	390KΩ	½	503439	BTS-390K	
R75	18KΩ	½	503318	BTS-18K	
R76	120KΩ	½	503143	BTS-120K	
R77	8200Ω	½	503282	BTS-8200	
R78	680KΩ	½	503468	BTS-680K	
R79	270KΩ	½	503427	BTS-270K	
R80	22KΩ	½	503322	BTS-22K	
R81	2.2Meg	½	503522	BTS-2.2Meg	
R82	680KΩ	½	503468	BTS-680K	
R83	47KΩ	½	503347	BTS-47K	
R84	22KΩ	½	503322	BTS-22K	
R85	8200Ω	½	503282	BTS-8200	
R86	3900Ω 5%	½	502339	BTS-3900 5%	
R87	22KΩ	½	503322	BTS-22K	
R88	1MEg	½	503318	BTS-1MEg	
R89	470KΩ	½	503447	BTS-470K	Note 4
R90	1.2Meg	½	5035[illegible]	BTS-1.2Meg	Note 5
R91	100KΩ	1	513410	BTA-100K	Note 6
R92	100KΩ	1	513410	BTA-100K	
R93	56KΩ 5%	1	512356	BTA-56K 5%	
R94	8200Ω	1	513282	BTS-8200	
R95	270KΩ 5%	½	502427	BTS-270K 5%	
R96	8200Ω	½	503282	BTS-8200	
R97	1.2Meg	½	503512	BTS-1.2Meg	
R98	1.1Meg 5%	½	502511	BTS-1.1Meg 5%	
R99	390Ω	1	513139	BTA-390	Note 7
R100	3300Ω	1	513233	BTS-3300	
R101	15KΩ	½	503315	BTS-15K	
R102	560Ω	1		BTS-560	
R103	560Ω			BTS-560	
R104	1000Ω			BTS-1000	
R105	22KΩ	1	513222	BTS-22K	
R106	68KΩ		503368	BTS-68K	
R107	150KΩ		503415	BTS-150K	
R108	330KΩ		503433	BTS-330K	
R109	820KΩ		503482	BTS-820K	
R110	82KΩ		503382	BTS-82K	
R111	330KΩ		503433	BTS-330K	
R112	3900Ω 5%		502239	BTS-3900 5%	
R113	150KΩ 5%	1	512415	BTA-150K 5%	
R114	18KΩ	½	503318	BTS-18K	
R115	1.8Meg 5%	1	39063	BTA-1.8Meg 5%	
R116	47KΩ 5%	1	512347	BTA-47K 5%	
R117	820KΩ		503482	BTS-820K	
R118	470KΩ		503447	BTS-470K	
R119	2.2Meg		503522	BTS-2.2Meg	
R120	47Ω		503047		
R121	180Ω	2	76639	BW-2-180	
R122	6800Ω	2	523268	BTS-6800	
R123	56KΩ		503356	BTS-56K	
R124	270KΩ		503427	BTS-270K	
R125	5.1Ω		76798		
R126	100KΩ		503410	BTS-100K	

Note 1. Not used in chassis No. KC882B.
Note 2. Some models use a 39KΩ resistor in this application.
Note 3. Some models use a 120KΩ resistor in this application.
Note 4. Some models use a 390KΩ resistor in this application.
Note 5. Some models use a 1.5Meg resistor in this application.
Note 6. Some models use a 150KΩ resistor in this application.
Note 7. Some models use a 47Ω resistor in this application.
Note 8. Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.
T1	117VAC ⑫ 1.98A	562VCT .290ADC	5VAC ③ 5A	6.3VAC ⑪ 1.2A; SEC. 4 6.3VAC ⑭ 7.7A	77635	P-8167		TP-319		

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	DC RESISTANCE SEC.	REPLACEMENT DATA: RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
T2	201Ω Tap ⑨ 8Ω, 33Ω 370, 5Ω	0Ω	76795		HVO-2		D-19 ①		Horiz. Output Trans.
T3	530Ω	15Ω	77636	A-8113 ②	A-3038 ②	T8O-7	A-99X ③		Vert. Output Trans.
T4A	24Ω		77697 ③	DY-9A	MDF-70	TY-3	Y-17		Horiz. Deflection Coils.
B	44Ω								Vert. Deflection Coils.
T5	21Ω		76442	WC-5④⑤	MWC-1④⑤	TWL-1	WC-12⑤		Horiz. Lin. Coil
T6A	12Ω		76441	WC-5④⑤	MWC-1④⑤	TWL-1	WC-11⑤		Width Coil

① Connect term 7 to term 8.
② Drill one new mounting hole.
③ Complete with male connector plug.
④ Enlarge mounting hole.
⑤ Do not use secondary.
⑥ Connect to coded blue & red dot terminals.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	IMPEDANCE SEC.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	NOTES
T7	6.5KΩ	3.7Ω	340Ω	.44Ω	76997	A-3878 ①	A-3019	RO-301 ①	S-5X ①	① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: RCA Victor PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	12"	PM	3.7Ω	76093 ① 77777 ② 75022 ④ 77000 ⑤	12J11	12A31	①10" PM speaker used in models 21-T-314, 314U, 21-T-315, 315U, 21-T-316, 316U and 21-T-322, 322U. ②8" PM Used in models 21-T-313, 313U. ③5" PM Used in models 21-T-303, 303U.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (@ CURRENT 1000 Cps)	REPLACEMENT DATA: RCA Victor PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
L1	.290ADC	41Ω	1.06 Hy.	77676	C-2326 ①	C-2996 ①	TR-1733 ①	C-17X ①

① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RCA Victor PART No.	MILLER PART No.	MEISSNER PART No.	IRC PART No.	NOTES
L2	Ant. Trans.	.6Ω	.6Ω	73591				
L3	Ant. Trans.	.6Ω	.6Ω	73591				
L4	IF Trap	0Ω		76543				Includes core
L5	Ant. Shunt Coil	0Ω		76538				Includes core
L6	Ant. Shunt Coils	0Ω		76537				Includes core
L7	IF Trap	0Ω		76541				Includes core
L8	FM Trap	0Ω		76540				Includes core, core part #76543
L9	Ant. Coils	0Ω		76556				Includes stator complete with rotor coils C6, R8 and R10
L10	Ant. Shunt Coils	0Ω		77664				Includes stator complete with rotor, coils, C9 &R9 Channel 13
L11	Ant. Coil	0Ω		76561				
L12	Fil. Choke	0Ω		73477				
L13	IF Trap	0Ω		76535				
L14	Neutr. Coil	0Ω		76562				
L15	RF Coils	0Ω		76553				Includes stator complete with rotor, coils C17 & R14 Channels 13, part no. includes .8-3.8 MMF Capacitor
L16	RF Coil	0Ω		76529				
L17	Mixer Grid Coil	0Ω		77923				Includes stator complete
L18	Osc. Coils	0Ω		77205				Includes stator complete with rotor, coils, C23 & C24
L19	Fil. Choke	0Ω		76763				
L20	Fil. Choke	0Ω		76763				
L21	Fil. Choke	0Ω		77206				
L22	Conv. Plate	.2Ω	0Ω	77663				Includes 27KΩ resistor
L23	1st. Video IF	.1Ω	.2Ω	77637				Includes trap & 27KΩ resistor
L24	2nd. Video IF	.2Ω	.3Ω	77638	6219			
L25	Fil. Choke	0Ω		73477	4604			1.36 Microhenries
L26	3rd. Video IF	.3Ω	.2Ω	76433	6219			
L27	4th. Video IF	.2Ω	.2Ω	76433	6219			
L28	Series Peaking Coil	3.4Ω		76011	6176		19-3036	36 Microhenries
L29	Shunt Peaking Coil	7Ω		77526	6181		19-3250	250 Microhenries
L30	4.5MC Trap	3.2Ω		76983	1470		20-1004	
L31	Shunt Peaking Coil	26Ω		77124	4652 †			1000 Microhenries, wound on 10KΩ resistor in some Models.
L32	Series Peaking Coil	10Ω		77925	4646 ≡		19-3250 ≡	220 Microhenries * Wound on 27KΩ resistor
L33	Sound IF	1.7Ω		76981				Includes 22MMF capacitor and 120KΩ resistor
L34	Ratio Det.	11Ω	.4Ω CT	77113	1468		17-1033	Tertiary windings .3Ω
L35	Horiz. Osc.	70Ω		76440	6183		20-1402	Tapped ⑤ 55Ω, horiz. waveform winding-45Ω
L36	RF Choke	.72Ω		76540	4604		CL-1	1.5 Microhenries
L37	RF Choke	.2Ω		77125				

* Some Models use 250 microhenries series peaking coil in this application.
† Parallel with 10KΩ resistor
≡ Parallel with 27KΩ resistor

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: RCA Victor PART No. FUSE	RCA Victor PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG-P/T	1/4A ⑩ 250V	73600		318.250 (3AG-1/4A-P/T)		GJV-1/4	

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M2	Dial Lite		Mazda 51
M3A	R F Tuner	KRK11-B	Models 21-T-303, 313, 314, 315, 316, 322, 323, 324
B	R F Tuner	KRK12	Models 21-T-303U, 313U, 314U, 315U, 316U, 322U, 323U, 324U
M4	Switch	77656	Phono-Tone Control
M5	Magnet	76168	Focus
M6	Magnet	76141	Ion Trap
A11	Trimmer Capacitor	71496	IF Link Trimmer 5-70MMF
B3, B6	Trimmer Capacitor	75317	Horiz. Drive, locking range dual 10-180MMF

RCA VICTOR MODELS 21-T-303, U, 21-T-313, U, 21-T-314, U, 21-T-315, U, 21-T-316, U, 21-T-322, U, 21-T-323, U, 21-T-324, U (Ch. KC882, B)

PARTS LIST AND DESCRIPTIONS (Continued)

MISC. (CONT.)

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
	Cabinet Back	77791	Includes terminal board & power cord, Models 21T303, 303U
	Cabinet Back	77743	Includes power cords, for Models 21-T-313, 313U, 323, 323U, 324, 324U
	Cabinet Back	77744	Includes power cords, for Models 21-T-314, 314U, 315, 315U, 322, 322U
	Cabinet Back	77792	Includes power cords, for Models 21-T-316, 316U
	Safety Glass	77745	All Models
	Knob	77709	Brightness control for Mahogany, walnut or red cherry
	Knob	77718	Brightness control for blonde mahogany or oak
	Knob	77734	Brightness control for maple
	Knob	77699	Picture control for mahogany, walnut or red cherry
	Knob	77719	Picture control for blonde mahogany or oak
	Knob	77738	Picture control for maple
	Knob	77735	TV-Phono-Tone for mahogany, walnut or red cherry
	Knob	77736	TV-Phono-tone for blonde mahogany or oak
	Knob	77737	TV-Phono-Tone for maple
	Knob	77708	Channel Selector for Models using KRK11-B Tuners
	Knob	77751	Channel Selector for Models using KRK12 tuner (Mahogany,
	Knob	77752	Channel Selector for Models using KRK12 Tuners (Blonde mahogany or oak instr.)
	Knob	77753	Channel Selector for Models using KRK12 Tuner (for maple instr.)
	Knob	77707	Fine Tuning (Mahogany, walnut or red cherry) for Models using KRK11-B Tuners
	Knob	77717	Fine Tuning (blonde mahogany or oak) for Models using KRK11B tuners
	Knob	77733	Fine Tuning (maple) for models using KRK11-B Tuners
	Knob	77750	Fine Tuning for models using KRK12 tuners
	Knob	77710	Off/On Volume

TROUBLE SHOOTING AIDS (CONT.)

PROPER
L. F. BLANK
3924 MEADE
DENVER, COLORADO

VIDEO

SOUND BARS

Check adjustment of A11 (4.5MC Trap) in video amplifier grid circuit. Check local oscillator adjustment video IF alignment.

POOR RESOLUTION

Check by substitution video IF tubes. Check alignment of video IF stages.

SMEAR

Check video amplifier V7 and associated components, particularly the peaking coils.

ONE WIDE BLACK BAR

Check tuner, video IF, video detector and video amplifier tubes for filament to cathode leakage.

POOR CONTRAST

Check waveform W1.

If Unsatisfactory	If Satisfactory
Check V3, V4, V5 and V6. Check alignment.	Check waveform W2;

Check waveform W2.

If Unsatisfactory	If Satisfactory
Substitute V7 and check assoeiated components.	Check picutre tube and grid circuit components.

AUDIO

WEAK OR NO SOUND

Substitute V9, V10, V11, V12 and V13. Check associated components. Check speaker. Check sound IF and ratio detector alignment. Check function switch contacts.

BUZZ

Adjust ratio detector secondary for minimum buzz. If still noticable, substitute V11 and readjust.

DISTORTED

Check audio amplifier stages V12 and V13 using audio signal generator and scope.

If Undistorted	If Distorted
Substitute V9, V10, and V11. Check adjustment of ratio detector.	Check components of stage where distortion occurs.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V16, V17, V18 and V19. Check fuse in high voltage cage.
Check waveform W14.

If Unsatisfactory	If Satisfactory
Check horizontal oscillator components and coupling network between V16 and V17.	Check components of V17. Check T2 and T4. Check all associated components.

WEAK HIGH VOLTAGE

Follow procedure outlined under loss of high voltage.

BLOOMING

Substitute V17, V19, V20 and V21. Check associated components. Check picture tube.

LOSS OF FOCUS

Check C102for open. Follow procedure outlined under blooming.

POWER

SMALL RASTER, WEAK SOUND

Check B plus circuits for shorts. If no shorts are present and B plus is low, check V20 and V21 .

DIM PICTURE

Measure B plus.

If Low	If Normal
Substitute V20 and V21. Check for shorts.	Check V18and boost B plus circuit.

GENERAL

RASTER, BUT NO PICTURE, SOUND OR SNOW

Check by substitution V2, V3, V5, V6 and V7. Check associated components.

WEAK PICTURE AND WEAK SOUND

Substitute V4 and check components.

SOUND BUT NO PICTURE

Check by substitution V8 and V14. Check associated components.

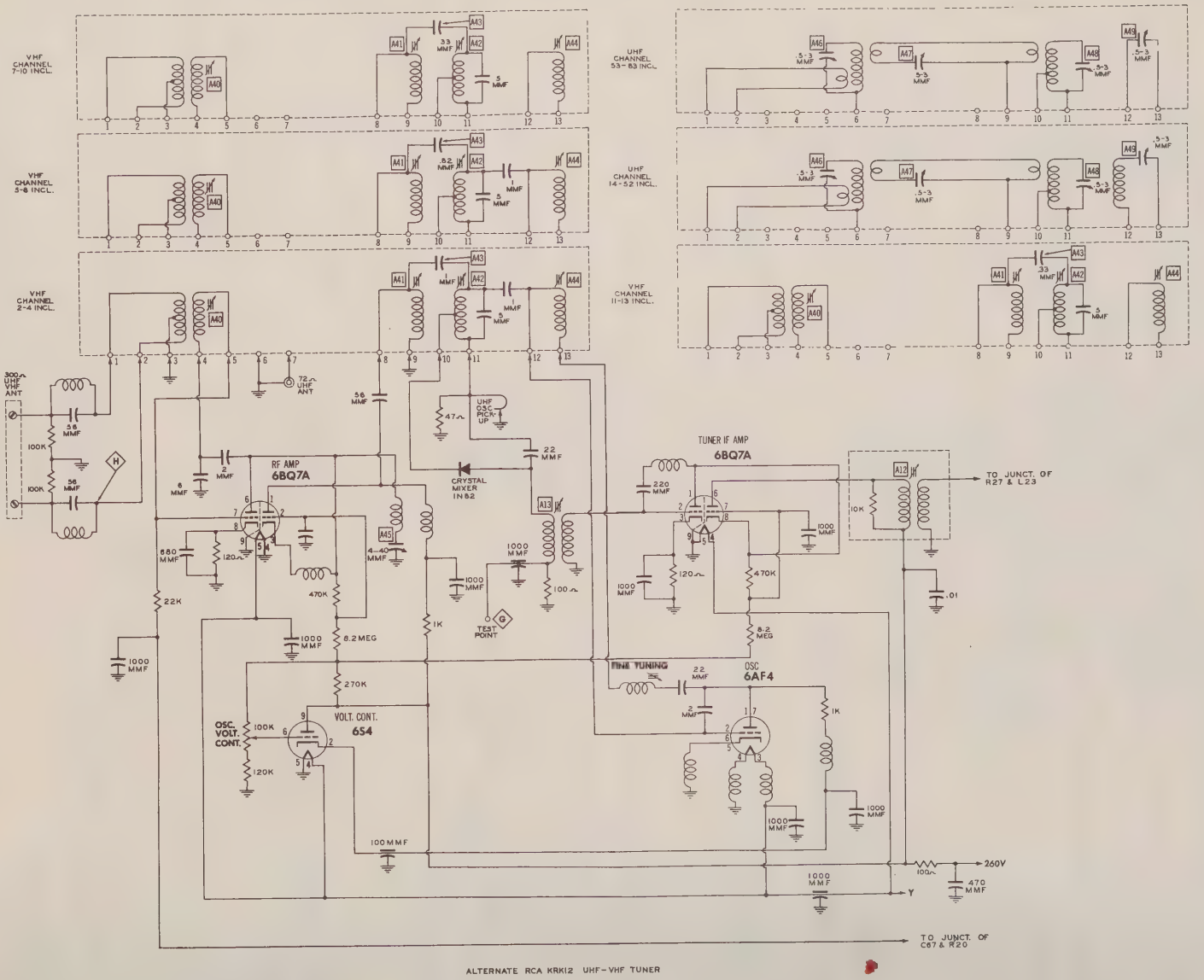
SNOWY PICTURE, GOOD SOUND

Substitute V1 and check components.

INTERMITTANT STREAKS

Check high voltage circuit for corona discharge and arcing. This may best be done by looking for a blue glow in the dark.

The Trouble - Shooting photographs shown above are made with permission of transmitting station WFBM-TV and in no way reflect the quality of the transmitted picture. Similarly, symptoms shown are assumed and are not indicative of the quality and workmanship of this receiving equipment.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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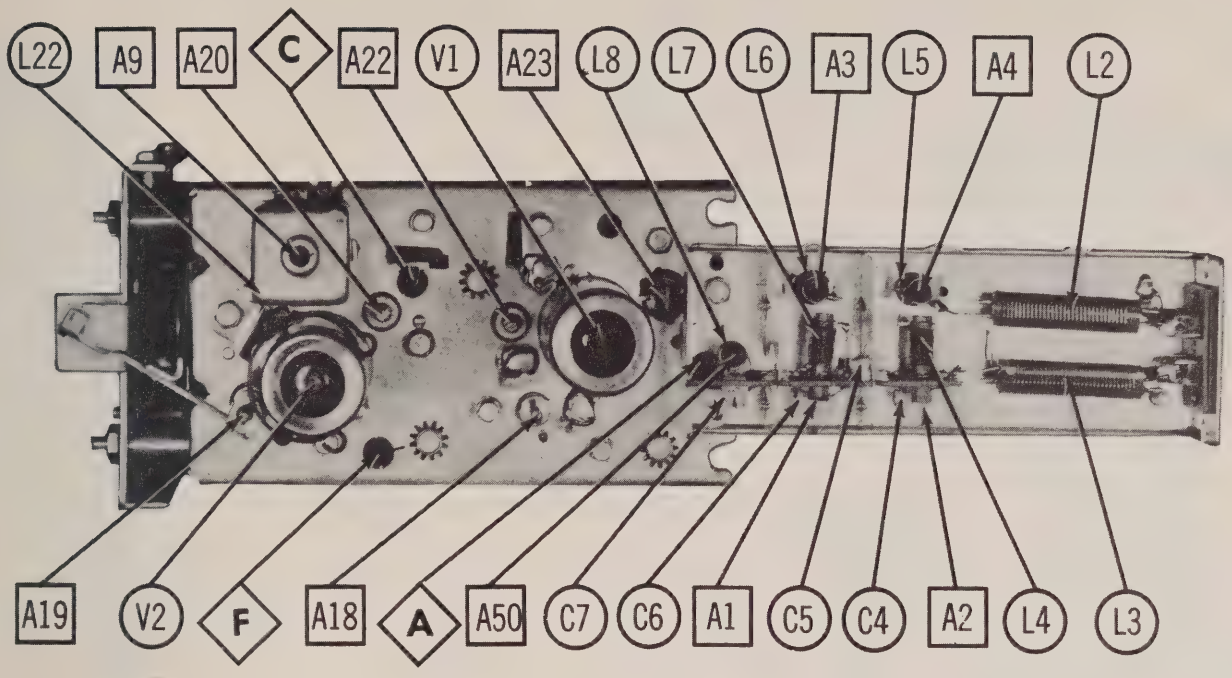
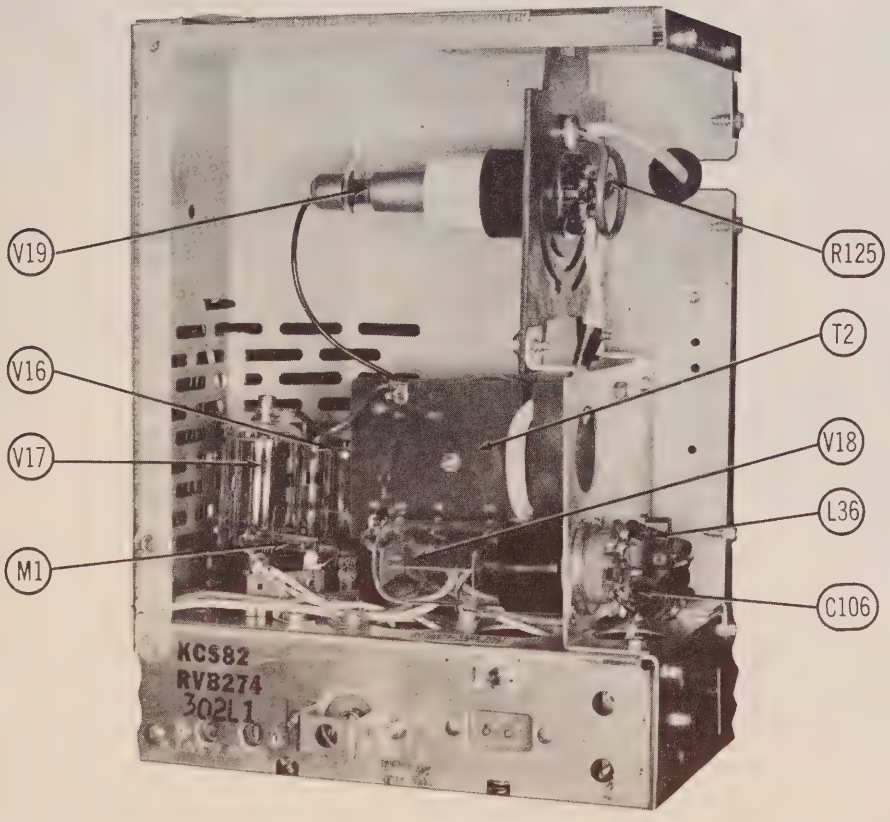
ALTERNATE TUNER SCHEMATIC



RF TUNER – TOP VIEW



HIGH VOLTAGE COMPARTMENT

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENT

Touch up adjustment of the RF Tuner oscillator circuit may be accomplished by removing the channel selector, fine tuning knobs and selector escutcheon. To remove escutcheon slide clip spring to the left.

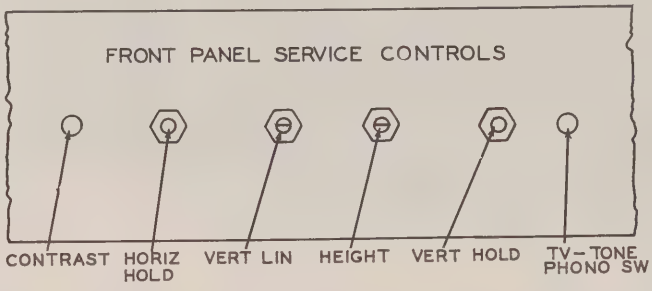
PICTURE TUBE SAFETY GLASS CLEANING

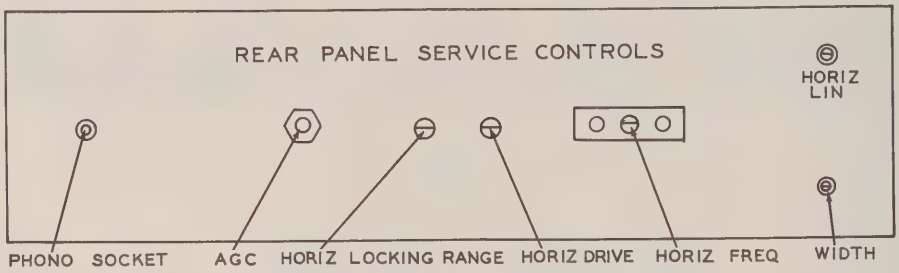
Remove 8 retainers from inside front of cabinet. Hold safety glass while removing metal frame. Remove safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION





SPECIAL ADJUSTMENTS - AGC CONTROL (On rear apron of chassis)

Turn brightness control fully clockwise. Turn AGC control fully counter clockwise, then clockwise until a very slight bend or change of bend in picture is noted. Then turn counter clockwise enough to remove bend or change in bend. With very weak signals turn AGC control clockwise until snow in picture becomes more pronounced, then counter clockwise until best signal to noise ratio is obtained. Adjustment should be made on a strong signal if possible.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horiz. freq. slug until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L34) located on bottom of chassis. (See tube placement chart).

FUSES

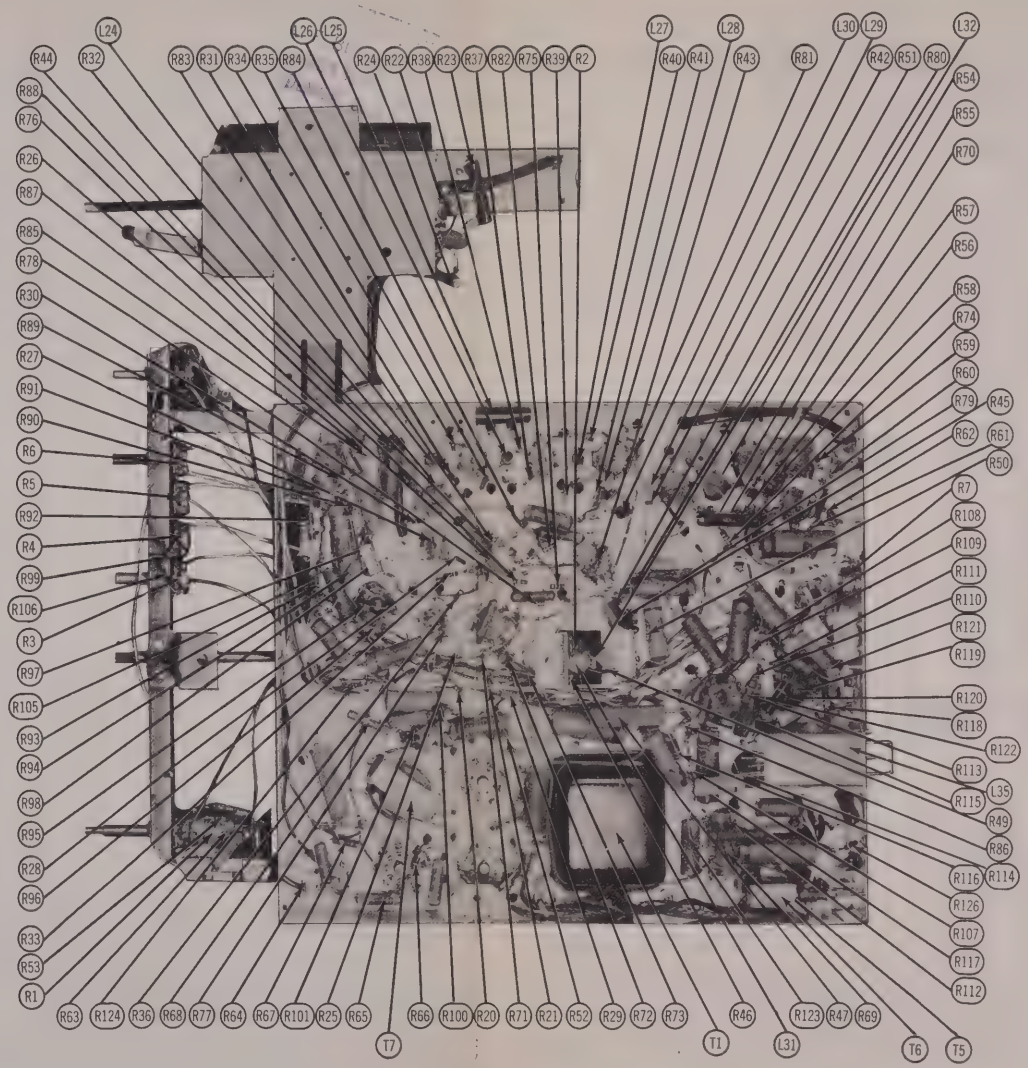
One fuse is used for horizontal sweep circuit protection. (See tube placement chart for location).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 6 push on type control knobs from front panel.
2. Remove 2 wood and 2 metal screws. Remove rear cover.
3. Disconnect speaker, yoke plug, CRT socket, HV lead and yoke bracket ground strip.
4. Remove 6 chassis bolts. Remove chassis.
5. Remove 3 speaker nuts. Remove speaker.

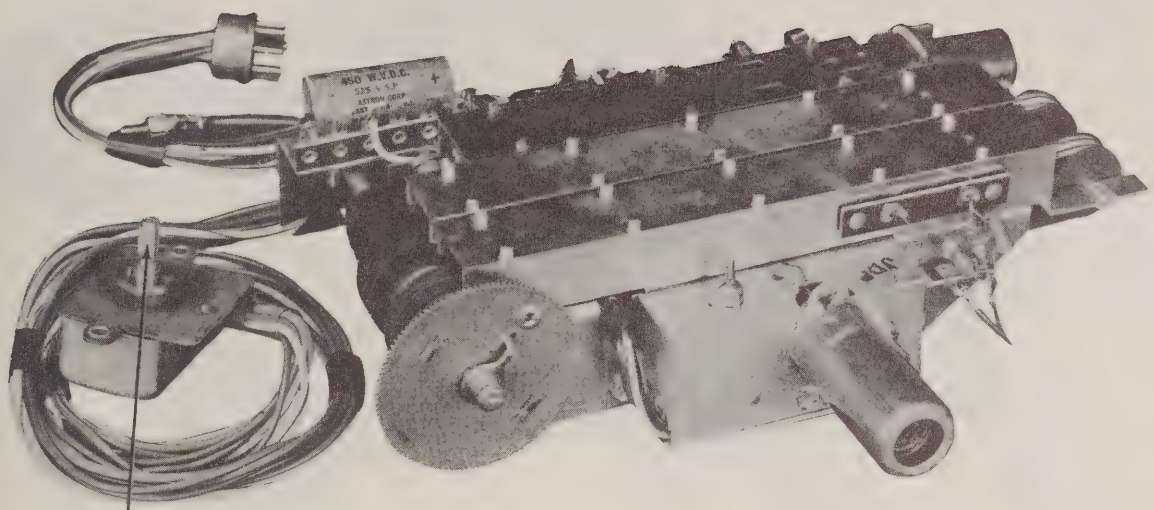


CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

RAYTHEON
MODEL UHF-100 (UHF Tuner)

PROPERTY OF
L. F. PLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

RAYTHEON
MODEL UHF-100 (UHF Tuner)



UHF-VHF SELECTOR

RAYTHEON
MODEL UHF-100 (UHF Tuner)

TRADE NAME	Raytheon Model UHF-100
MANUFACTURER	Raytheon Tel. & Radio Corp., 5921 Dickens Ave., Chicago 39, Illinois
TYPE SET	UHF Tuner for Raytheon VHF Television Receivers
TUBES (Two)	Types 6AF4 Oscillator, 6BK7 IF Amp.
POWER SUPPLY	280 Volts DC & 6.3 Volts AC
TUNING RANGE	Channels 14 thru 83

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The tuner should be connected to its associated VHF receiver and operating normally.
The cascode Pre-IF amplifier can be aligned, if necessary, by connecting a 25MC unmodulated signal to the junction of L4 and L5 and a VTVM across the video IF detector load resistor.
Adjust A1 and A2 for maximum deflection on VTVM.
In the event of dial cord replacement or component replacement, the RF cavities may be adjusted for peak performance.
Tune to a UHF program, loosen the pulley positioning screw (Fig. 1) and rotate the RF drive pulleys for best picture.
Tighten the positioning screw.
Complete realignment of the UHF Tuner involves the use of precision UHF test equipment and should not be attemped in the field.

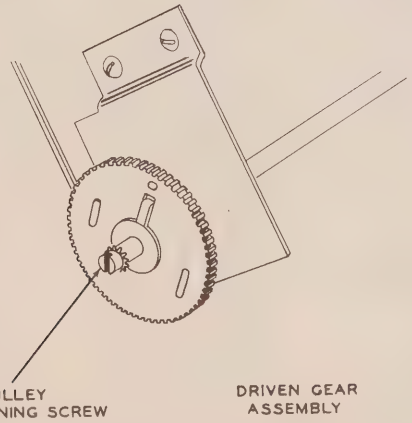


FIG. 1

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
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PARTS LIST AND DESCRIPTIONS

RAYTHEON
MODEL UHF-100

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1	RF Oscillator	6AF4	6AF4	7DK	
V2	IF Amplifier	6BK7	6BK7	9AJ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	8	450	8C-13453	PRS450/8		BR845A		TC71	TVA-1704	
C2	1000		8G-20878	CN-1-001	MFT-1000					
C3A	1000		8G-19506	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C4A	1000		8G-19506	BPD-2X001	DD-2-102	TM5DD1	812-001	DCD-521	5HK-2D1	
B	1000									
C5	47		8G-20740	BPD-000047	D6-470		GP1K-470	UC-5447	5GA-Q47	
C6	1000		8G-13201	S11000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C7	1000		8G-13201	S11000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C8	1000		8G-13201	S11000	D6-102	TM5D1	GP2L-102	UC-521	5HK-D1	
C9	22			SI22N750	TCN-22		N750K-220		5TCU-Q22	Note 1
C10	20		8G-21315							
C11	100			S1100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	Note 1
C12	100			S1100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	Note 1

Note 1 Not used on all units.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R1	680KΩ	1/2		BTS-680 K	Note
R2	4700Ω	1/2	9B1-70	BTS-4700	
R3	22Ω	1/2			Note
R4	160Ω-5%	1/2	9B1-140	BTS-160-5%	
R5	12KΩ	3	9C11-1112		

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R6	10KΩ	1/2	9B1-74	BTS-10K	
R7	3900Ω	1/2	9B1-69	BTS-3900	
R8	1500Ω	1/2	9B1-64	BTS-1500	
R9	27KΩ	1/2	9B1-79	BTS-27K	
R10	22Ω	1/2			

Note : Not used in all models.

COILS (RF-IF)

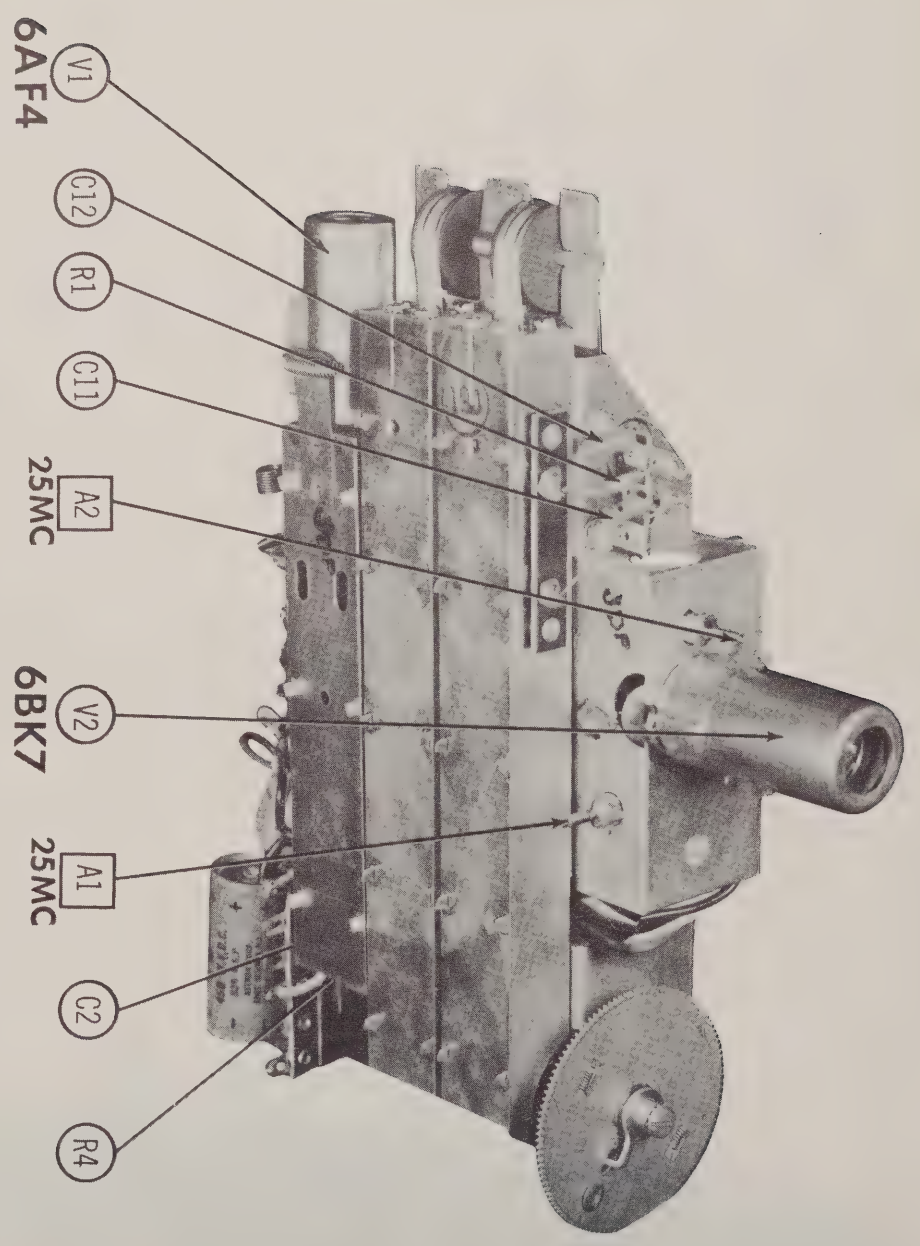
ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: MILLER PART No.	REPLACEMENT DATA: MEISSNER PART No.	NOTES
L1	Fil. Choke	0Ω		16A-20469			
L2	Cathode Choke	0Ω		16A-20470			
L3	IF Coupling	.8Ω		16A-20537			
L4	IF Input Coil	.6Ω					Note 1
L5	RF Choke	2.6Ω					Note 2
L6	IF Output Coil	.8Ω		201-20483			

Note 1. Some Models use tapped IF Input coil, part #201-20482.
Note 2. Not used in all models.

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M1	Crystal Diode	8M-21655	Converter (CK-710)
M2	Switch	20F-12108	UHF-VHF Selector
	RF Dial Cord	200-21772	With Ribbon (4 11/16")
	RF Dial Cord	200-21357	With Lug (5")
	Osc. Dial Cord	200-21309	With Lug & Spring (10 9/16")
	Osc. Dial Cord	200-21310	With Lug & Spring (7 7/8")

CHASSIS—TOP VIEW



SERVICING HINTS

To determine whether the oscillator section is functioning , a convenient check point has been provided where the oscillator current can be measured. To measure the oscillator grid current, remove the jumper wire (refer to photos) and place a suitable milliammeter on the 10 milliampere scale in its place. A reading of 1 to 3 milliamperes should be obtained, if the oscillator is functioning normally. Later units may incorporate a 22Ω resistor in place of the jumper. In these units connect the ammeter on the 100 microamp scale across the resistor. A reading of 10 to 30 microamperes should be obtained.

Both the oscillator and crystal detector can easily be check by measuring the oscillator injection current. Place a multimeter on the 100 microamp scale at the terminal on the underside of the chassis (white lead from UHF tuner). A reading of 5 to 40 microamperes should be obtained if both the oscillator and crystal are functioning normally.

If soldering iron servicing, crystal detector or mechanical parts replacement is necessary, the picture tube must be removed. Removing the picture tube makes the majority of the UHF tuner components within easy reach and most of the parts can be serviced. The tuner should not be removed from the chassis.

CAUTION: When attempting to service the tuner, do not move or rearrange any components or mechanical parts as a change in the distributed capacity may result and offset the alignment. When replacing a component be sure to obtain the same lead lengths and replace it in the same physical position.

CRYSTAL DETECTOR: If replacement of the CK-710 crystal detector is necessary, the picture tube must be removed along with the crystal cover. The crystal is soldered in place and should be carefully resoldered after replacement. Overheating may damage the crystal. To dissipate the heat, grasp each crystal lead with a pliers when soldering into place.

DRIVE CORD STRINGING

If for any reason the drive cord of either the RF or oscillator cavities need replacement, the exact cord and length are recommended. The cord used is of a special material which is not affected by temperature or moisture. Refer to the parts list for the correct replacement. The oscillator drive assembly consists of four (4) separate drive cords each locked to the oscillator drive pulley (Fig. 2). Each RF drive assembly consists of two separate drive cords which are loced to the RF cavity drive pulley (Fig. 3). If the drive cord requires replacement, the picture tube should be removed along with the cavity cover. Follow the diagram and replace the cord as indicated. After replacement follow the instruction for realignment on page 1.

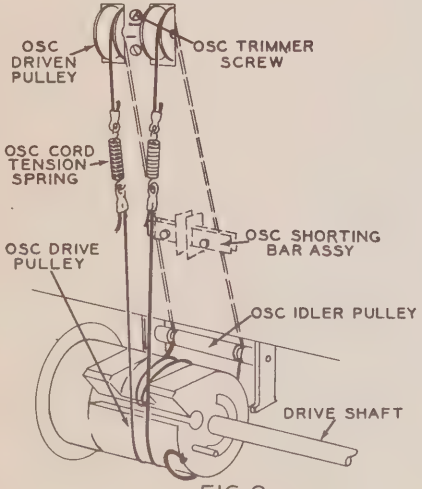


FIG 2

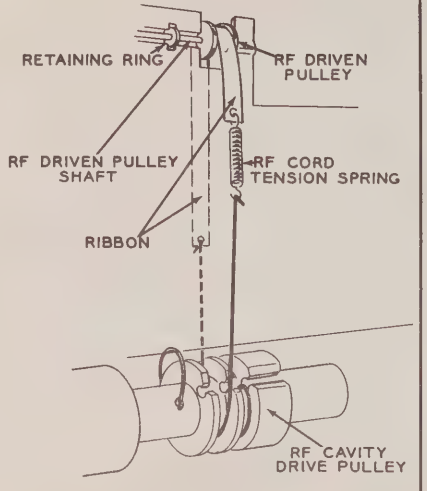
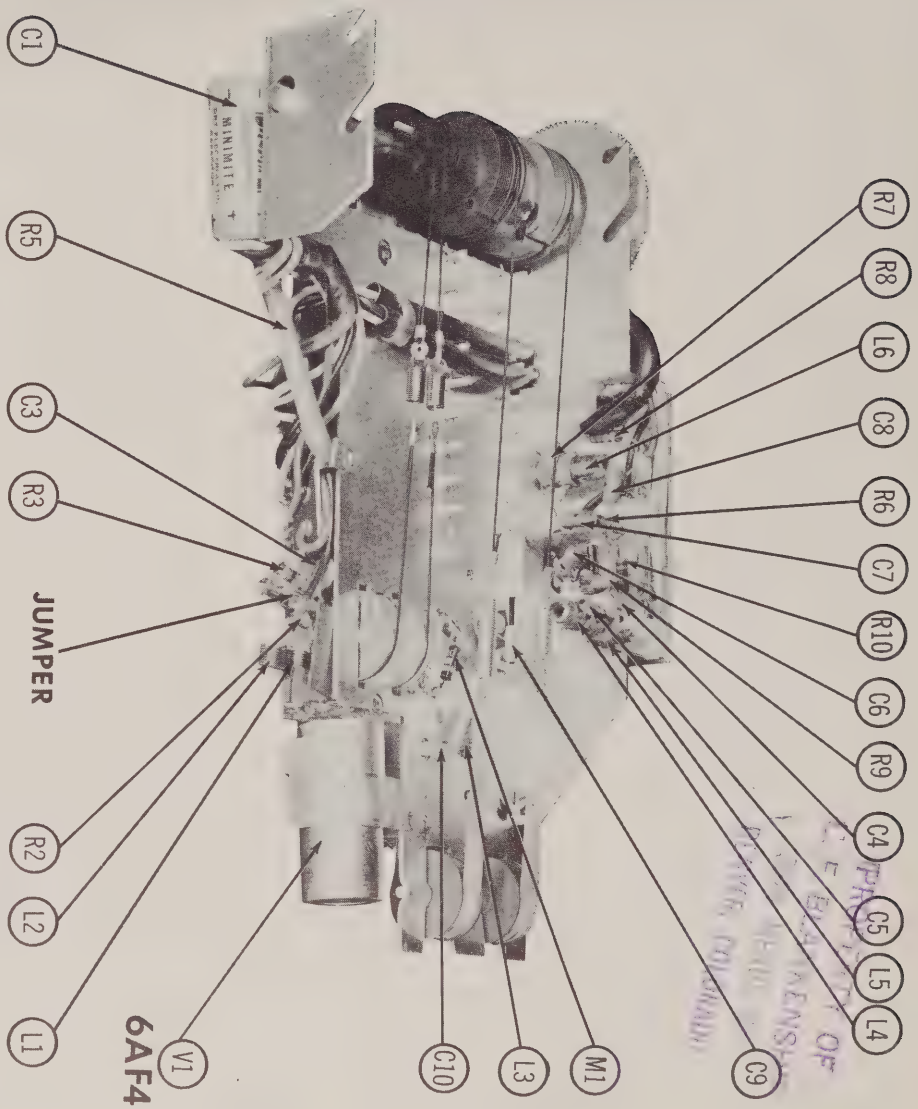


FIG 3

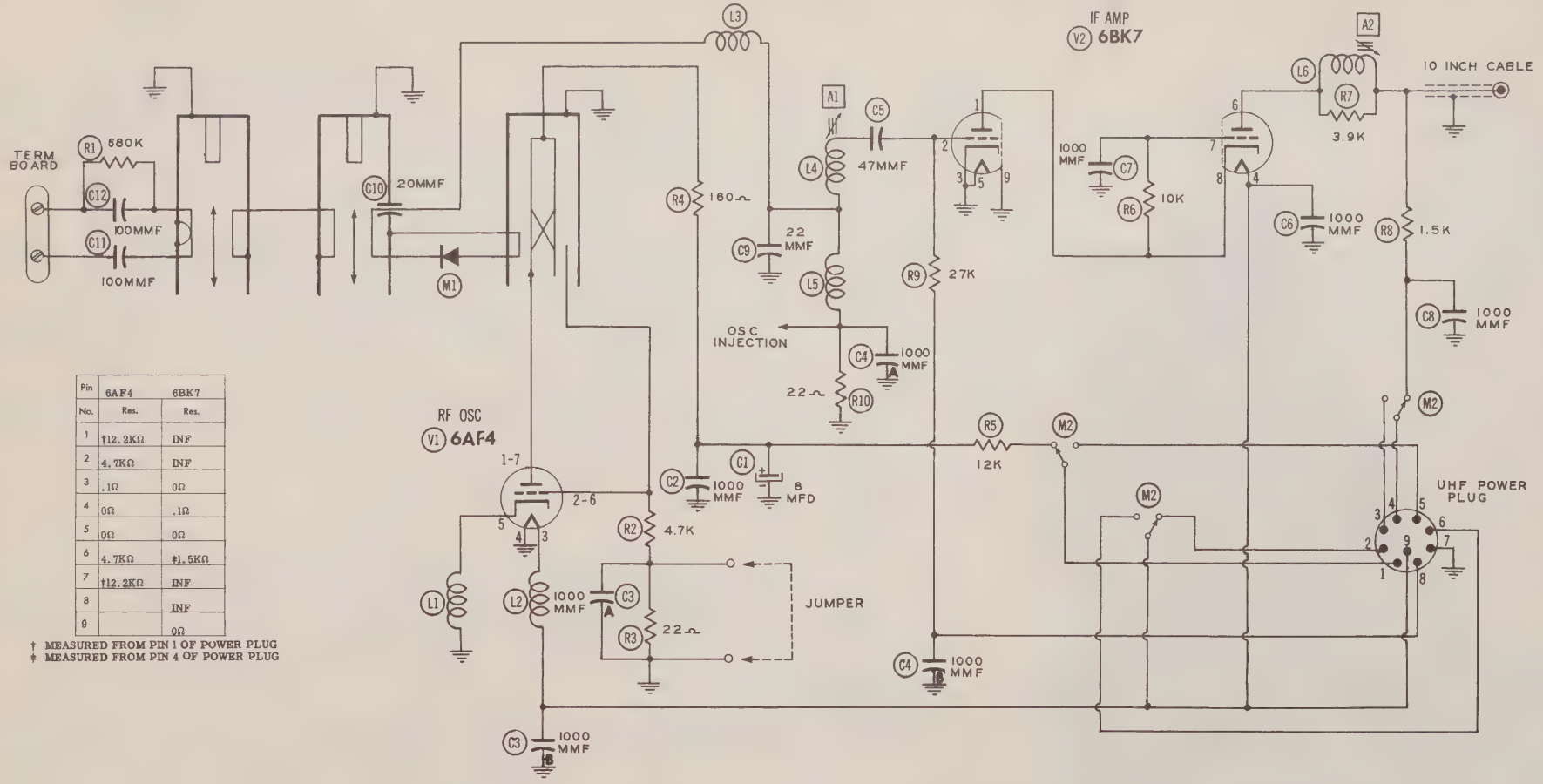
CHASSIS—BOTTOM VIEW



SET 207 FOLDER 8

RAYTHEON MODEL UHF-100

RAYTHEON MODEL UHF-100



Pin No.	6AF4 Res.	6BK7 Res.
1	†12.2KΩ	INF
2	4.7KΩ	INF
3	.1Ω	0Ω
4	0Ω	.1Ω
5	0Ω	0Ω
6	4.7KΩ	‡1.5KΩ
7	†12.2KΩ	INF
8		INF
9		0Ω

† MEASURED FROM PIN 1 OF POWER PLUG
‡ MEASURED FROM PIN 4 OF POWER PLUG

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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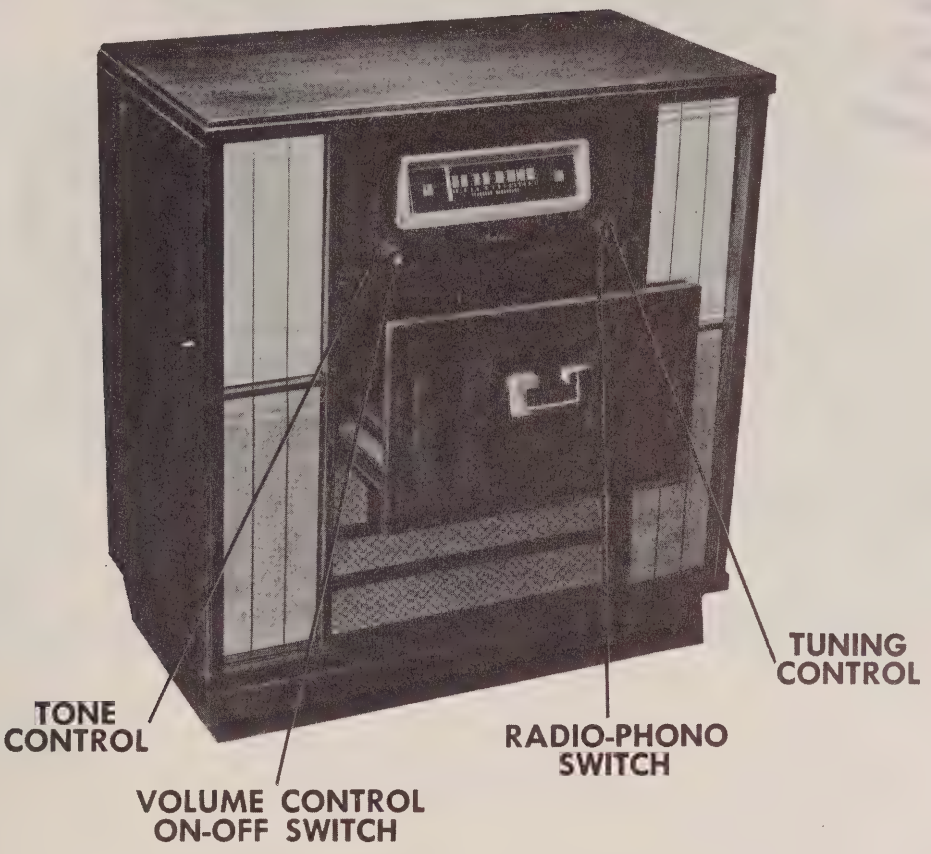
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SILVERTONE
MODEL 2056 (Ch. 132.026-3)



SILVERTONE
MODEL 2056 (Ch. 132.026-3)

TRADE NAME	Silvertone Model 2056 (Ch. 132.026-3)
SUPPLIER	Sears, Roebuck & Co., 925 So. Homan, Chicago, Ill.
TYPE SET	AC Operated AM-Phono Combination Superheterodyne Receiver
TUBES (Six)	Types 6BJ6 RF Amp., 6BE6 Conv., 6BJ6 IF Amp., 6AT6 Det.-AVC-AF Amp., 6V6GT Audio Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn tuning gang fully closed and set pointer to last index mark at left end of dial back plate. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to stator plates, center section of tuning gang. Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1650KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	Tune to 600KC signal	"		Check tracking at 600KC. If necessary bend outside rotor plates of RF and antenna sections of tuning gang for optimum tracking, then repeat step 3.

RECORD CHANGER UNIT- SILVERTONE MODEL 488.219

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		SILVERTONE PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BJ6	6BJ6	7CM	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BJ6	6BJ6	7CM	
V4	Det-AVC-AF Amp.	6AT6	6AT6	7BT	
V5	Audio Output	6V6GT	6V6GT	7S	
V6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▬20	450	N-25803	AFH4-67		D052		FP444	TVL-3780	
B	■20	450							TVA-1205	
C	▲20	450								
D	20	25								
C2	.047	200		P288-047	DF-503	PJ2S5		PT4147	2TM-S47	Note 1
C3	100	500		1469-0001	TCZ-100	5R5T1	NP0-333-101	MCB235	MS-31	
C4	.047	600		P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C5	.01	200		P488-01	D6-103	PTE4S1	811-01	PT411	4TM-S1	Note 2
C6	1.5			S11.5NP0	TCZ-1.5		NP0K-1R5	ZT-5515	5TCCB-V15	
C7	.047	600		P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C8	.047	200		P288-047	DF-503	PJ2S5		PT4147	2TM-S47	
C9	.047	200		P288-047	DF-503	PJ2S5		PT4147	2TM-S47	
C10	.047	600		P688-047	DF-503	PTE6S47		PT6147	6TM-S47	
C11	.047	200		P288-047	DF-503	PJ2S5		PT4147	2TM-S47	
C12	100	500		1468-0001	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C13	.01	400		P488-01	D6-103	PTE4S1	811-01	PT411	4TM-S1	
C14	220	500		1468-00025	D6-221	5W5T25	GP2K-221	MC240	1FM-325	
C15	.0047	600		P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C16	.005	200		P688-005	D6-502	PTE6D5	811-005	PT625	6TM-D5	
C17	.047	600		P688-047	DF-503	PTE6S47		PT6247	6TM-S47	
C18	.1	400		P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C19	.0047	600		P688-0047	D6-472	PTE6D47	GP2-333-472	PT6247	6TM-D47	
C20	.01	600		689ZX-01		PJ6S1		PT611	6TM-S1	
C21	.01	600		689ZX-01		PJ6S1		PT611	6TM-S1	

Note 1. Some Models use .01MFD in this application.
Note 2. Some Models use .047MFD in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	N25774	QJ-449R*			UF55L	Tone-Panel.
B	1 Meg.	½					UR16-T25	Volume-Tapped @ 220KΩ-Rear.
C	Switch						US-26	Attach to R1B.

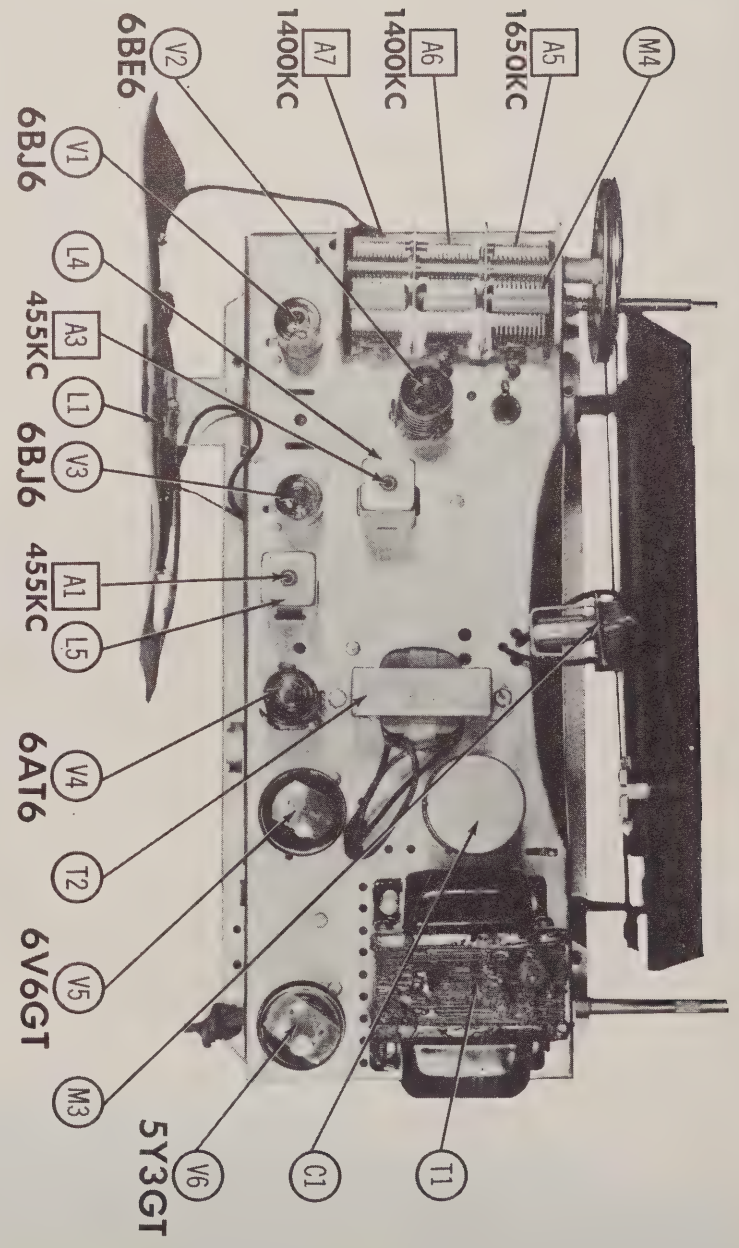
* CONCENTRIKIT EQUIVALENT - KIT, K-2, BASE ELEMENTS & SHAFTS B11-133 & P1-200 (Panel) B13-137X & R1-216 (Rear) & SWITCH 76-1.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R2	330Ω	½		BTS-330	
R3	100KΩ	½		BTS-100K	
R4	33KΩ	½		BTS-33K	
R5	330Ω	½		BTS-330	
R6	8200Ω	1		BTA-8200	
R7	2.2Meg	½		BTS-2.2Meg	
R8	18KΩ	1		BTA-18K	
R9	470Ω	½		BTS-470	
R10	100KΩ	½		BTS-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R11	15Meg	½		BTS-15Meg	
R12	100KΩ	½		BTS-100K	
R13	220KΩ	½		BTS-220K	
R14	4700Ω	2		BTB-4700	
R15	220KΩ	½		BTS-220K	
R16	270Ω	1		BTA-270	
R17	820Ω	1		BTA-820	
R18	750Ω	5	N23970-14	1 3/4A-750	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	SILVERTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.
T1	117VAC @.53A	610VCT .063ADC	5VAC @2A	6.3VAC @1.5A	N-24440		P-3151 ①	PV-70 ①	R-7A

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		SILVERTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T2	5.1KΩ	3.6Ω	470Ω	.82Ω	N-24776-3	A-3849	A-3019 ①	RO-9 ①	S-5X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	8"	PM	3.6Ω	N-24725	ST-115 Mod. P8-V	8A21	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	SILVERTONE PART No.	MILLER PART No.	MEISSNER PART No.	
L1	Loop Ant.	.1Ω	2.1Ω	N40356			
L2	RF Coil	24Ω	8Ω	N25828-1	70A	14-1071	
L3	Osc. Coil	.6Ω	6.5Ω	N24482-1			
L4	Input IF	21Ω	21Ω	N21797-16	12-C1	16-6758	
L5	Output IF	21Ω	21Ω	N21797-16	12-C2	16-6758	

PHONO CARTRIDGE and NEEDLE

ITEM No.	REPLACEMENT DATA						REMARKS
	SILVERTONE PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	K3797	GC-AG-J	G-AG	WC36B	A56U	43	0-2 or S-2	

ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					SILVERTONE PART No.		
M3	Bayonet	6-8	.150	Brown	N19351		Type #47

PHONO NEEDLE

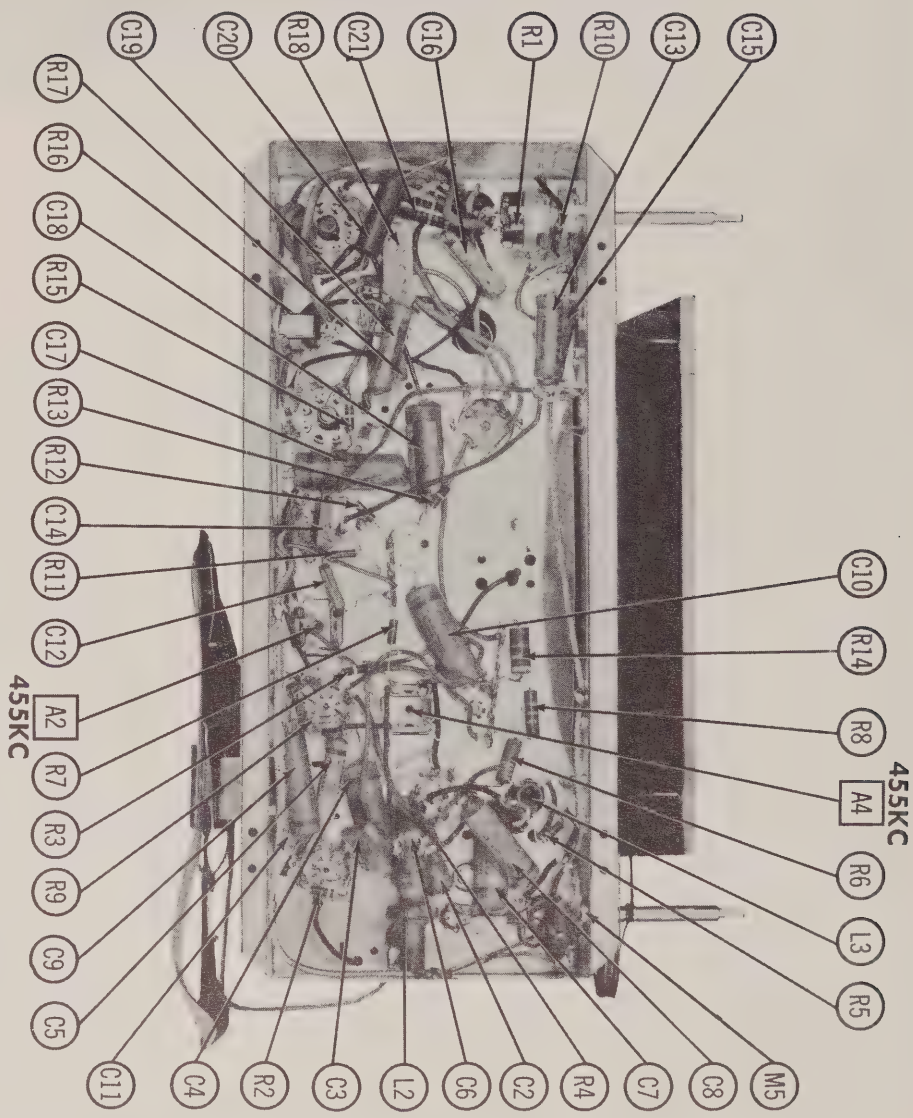
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	SILVERTONE PART No.	WALCO PART No.	JENSEN PART No.	
M2		W-3AGS or W-3AGA	S-642 or S-652	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M4	Tuning Capacitor	N25802	25-427MMF, 25-386MMF, 26-170MMF
M5	Switch	N25773	Function Selector
	Rear Cover	N25839	
	Crystal (Dial)	N25796	
	Escutcheon	N25727	
	Knob	N25786-1	Off/On Volume, Function Selector (2 used)
	Knob	N25785-1	Tuning, Tone (2 Used)

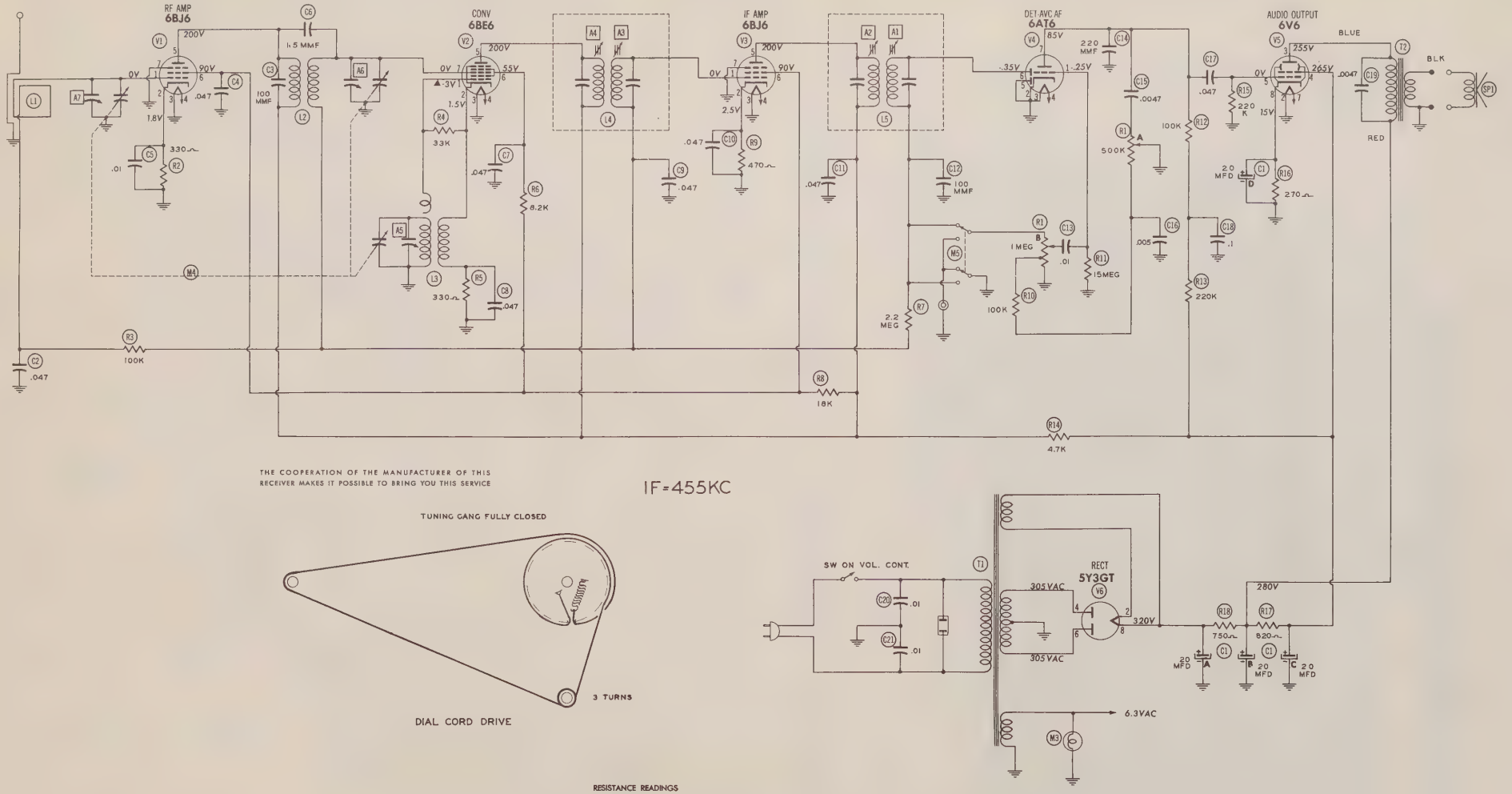
CHASSIS—BOTTOM VIEW



SILVERTONE MODEL 2056 (Ch.132.026-3)

SET 207 FOLDER 9

SILVERTONE MODEL 2056 (Ch.132.026-3)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BJ6	3.3Meg	330Ω	0Ω	.1Ω	†6.3KΩ	†24KΩ	0Ω	
V 2	6BE6	33KΩ	330Ω	0Ω	.1Ω	†6.3KΩ	†32KΩ	3.2Meg	
V 3	6BJ6	3.2Meg	470Ω	0Ω	.1Ω	†6.3KΩ	†24KΩ	0Ω	
V 4	6AT6	15Meg	0Ω	0Ω	.1Ω	0Ω	1Meg	†320KΩ	
V 5	6V6GT	0Ω	0Ω	†1.2KΩ	†1.6KΩ	220KΩ	INF	.1Ω	270Ω
V 6	5Y3GT	INF	5Meg	INF	178Ω	INF	169Ω	INF	5Meg

ALL MEASUREMENTS TAKEN WITH FUNCTION SELECTOR SWITCH IN "RADIO" POSITION
▲ TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 8 OF V6.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

SILVERTONE MODELS 2130, 2170-D, -E, 2172, 3127, 3170-B, 3177, 3187 (Ch. 100.210, -1, -3)

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MODEL 3170

SILVERTONE MODELS 2130, 2170-D, -E, 2172, 3127, 3170-B, 3177, 3187 (Ch. 100.210, -1, -3)

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DATE 6–53 SET 207 FOLDER 10

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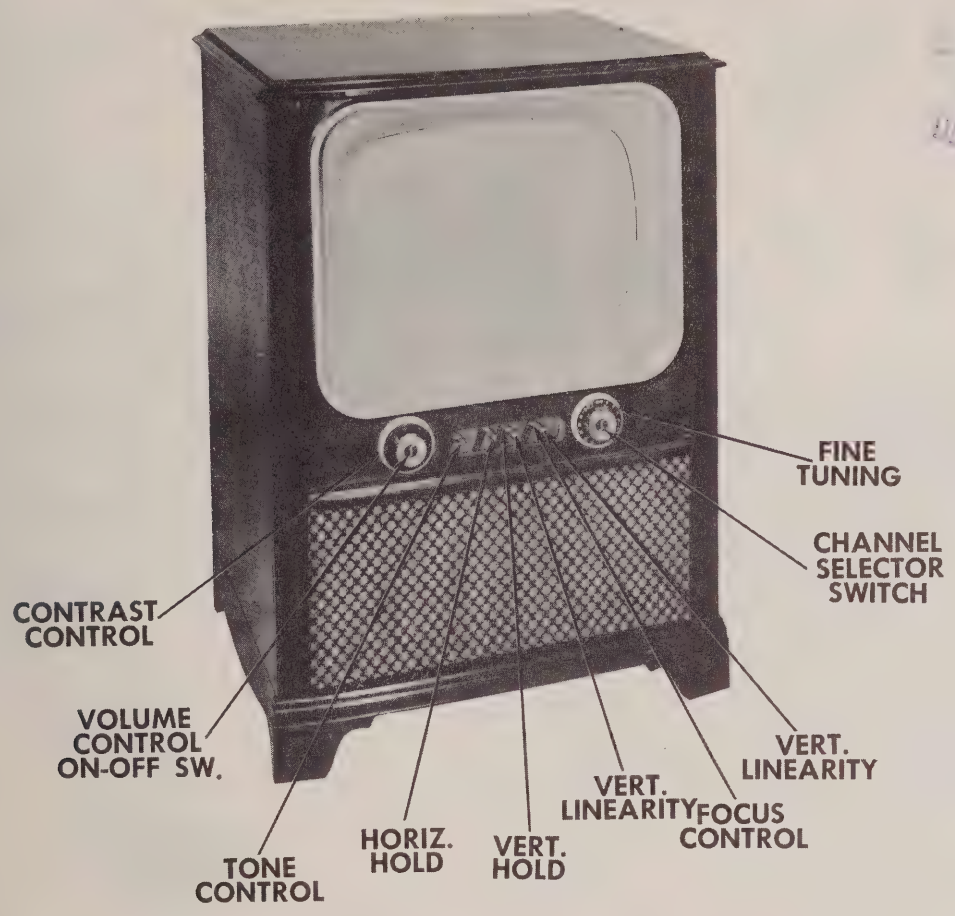
*TRADE MARK

SILVERTONE MODELS 2130, 2170-D, -E, 2172, 3127, 3170-B, 3177, 3187 (Ch. 100.210, -1, -3)

SILVERTONE MODELS 2130, 2170-D, -E, 2172, 3127, 3170-B, 3177, 3187 (Ch. 100.210, -1, -3)



SILVERTONE MODEL 3170-B

TRADE NAME	Silvertone Models 2130, 2170-D, -E, 2172, 3127, 3170-B, 3177, 3187 (Ch. 100.210, -1, -3)
SUPPLIER	Sears Roebuck & Co., 925 So. Homan, Chicago, Ill.
TYPE SET	Television Receiver
TUBES	Nineteen
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.86 Amp. @ 117 Volst AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.75MC, Sound IF 22.25MC (Intercarrier)

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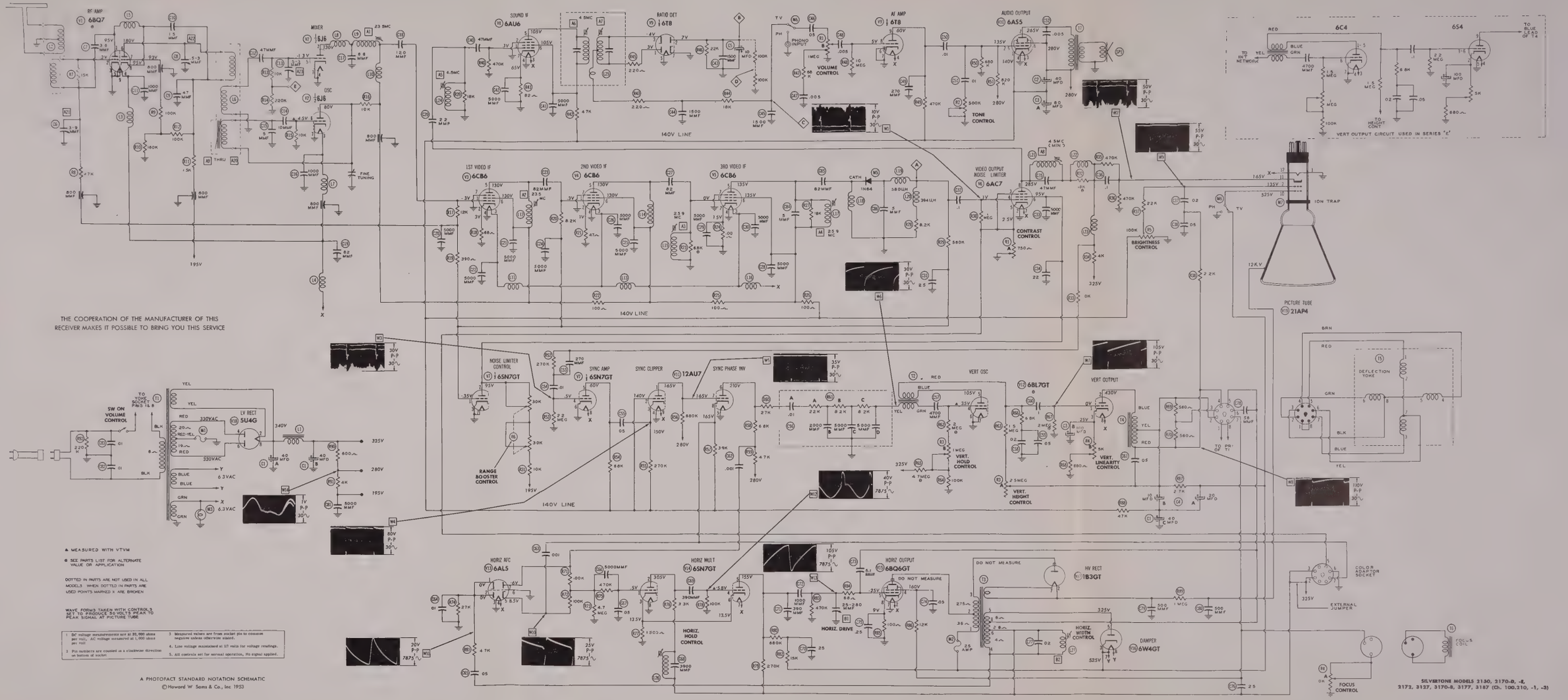

SILVERTONE MODELS 2130, 2170-D, -E, 2172, 3127, 3170-B, 3177, 3187 (Ch. 100.210, -1, -3)

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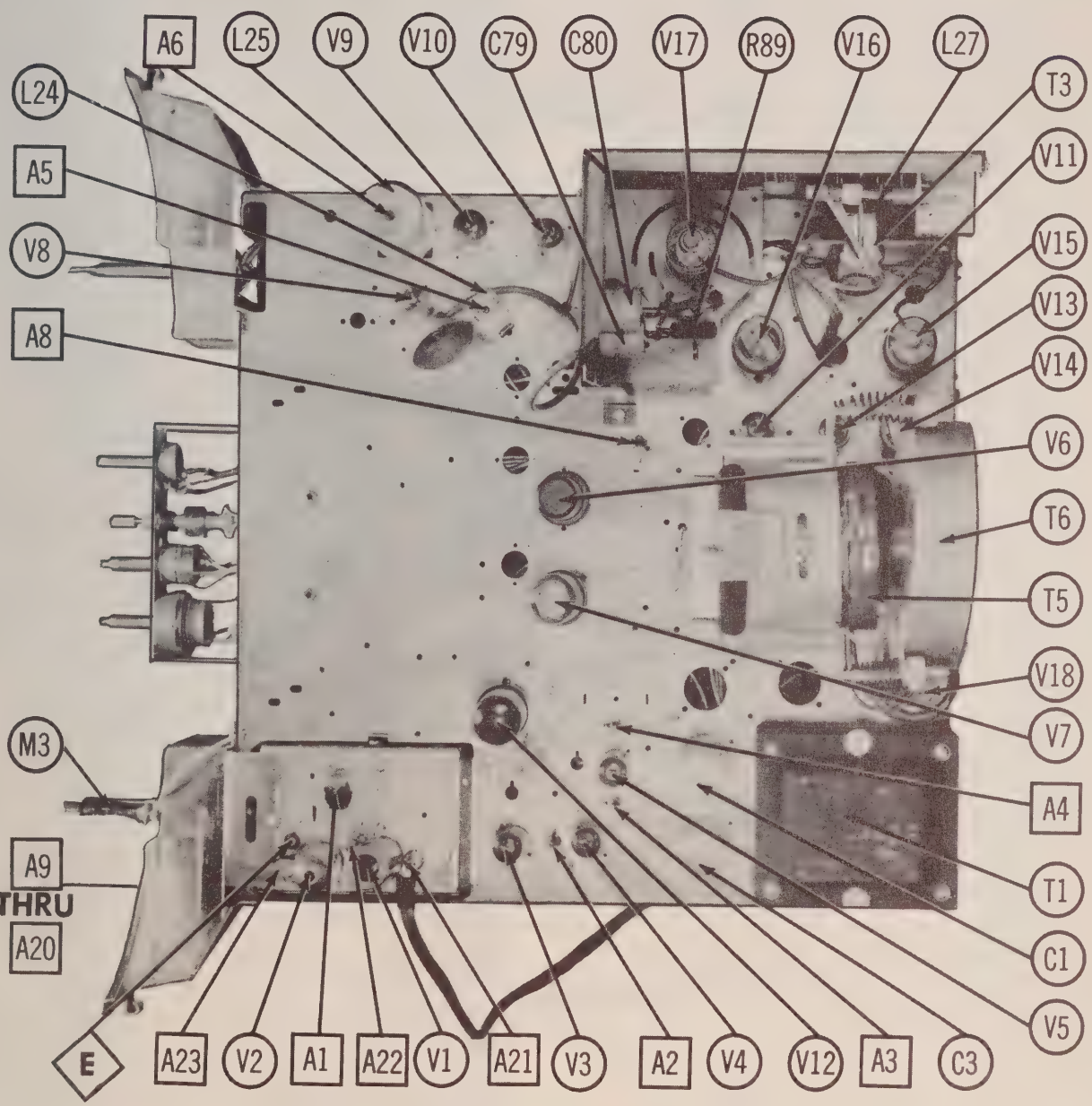

CHASSIS TOP VIEW

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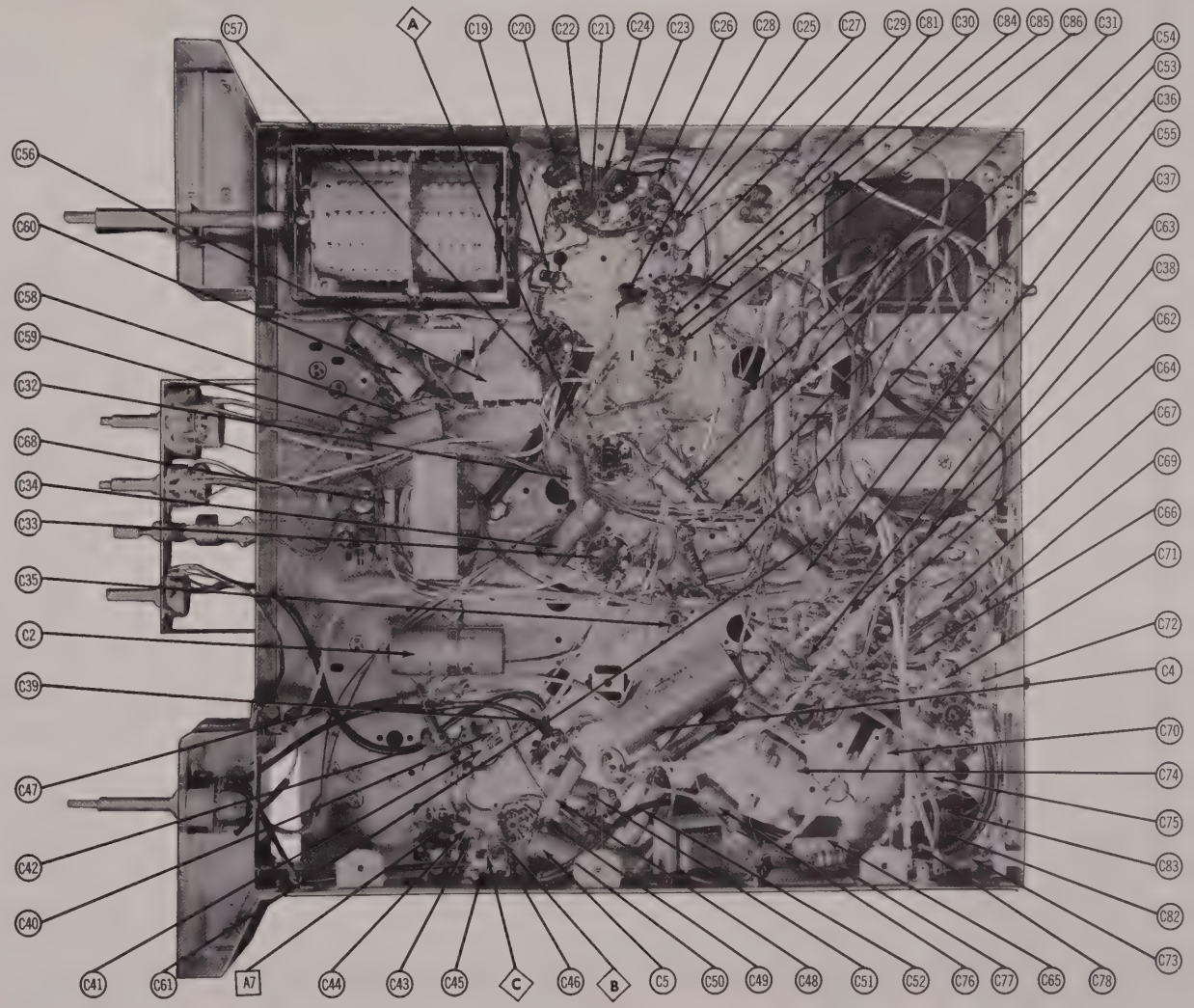
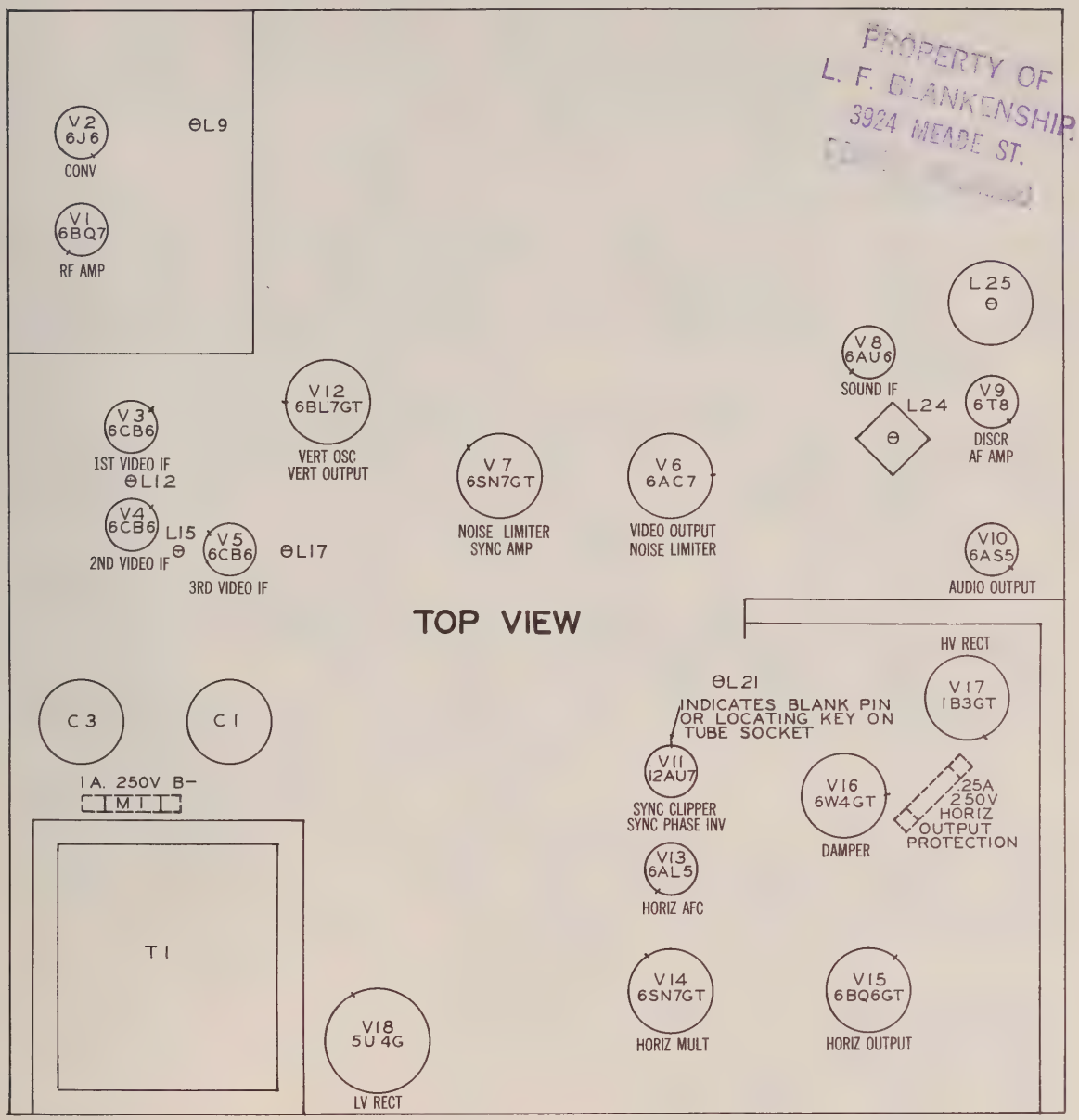


CHASSIS BOTTOM VIEW - CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms.
Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V18 Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V10
No pic, no sound has snow-V1, V2, V3
No pic, has sound, has raster-V6, V19
Has pic, no sound-V8, V9, V10
Overloaded picture-V7

SYNC FAILURE
No vert. sync-V11, V12
No horiz. sync-V11, V13, V14
No vert. or horiz. sync-V7, V11

SWEEP FAILURE
No raster, has sound-V14, V15, V16, V17 V19, Fuse (M2)
No vertical deflection-V12
Poor vert. linearity or foldover-V12
Poor horiz. linearity or foldover-V14, V15, V16
Narrow picture-V14, V15, V16, V17, V18
Vert. off freq. -V11 V12
Horiz. off freq. -V11, V13, V14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard can be eliminated by removing the horizontal multivibrator tube, V14, from its socket.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local ocillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C31. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23.5MC (Unmod.)	Any	DC probe to point ◇A◇. Common to chassis.	A1, A2	Adjust for maximum deflection.
2.	"	"	25.9MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	25MC (10MC Swp)	22.25MC 26.75MC	Any	Vert. Amp. to point ◇A◇. Low side to chassis.		Check for response curve similar to Fig.1. If necessary retouch A1 thru A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point ◇B◇ to chassis. The junction of these two resistors is alignment point ◇D◇ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.001MFD	High side to point ◇A◇. Low side to chassis.	4.5MC	Any	DC probe to point ◇B◇. Common to chassis.	A5, A6	Adjust for maximum deflection.
5.	"	"	"	"	DC probe to point ◇C◇. Common to point ◇D◇.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.001MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point ◇B◇. Low side to chassis.	A5, A6	Disconnect stabilizer capacitor C5. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
5.	"	"	"	"	"	Vert. Amp. to point ◇C◇. Low side to chassis.	A7	Reconnect capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of of crossover lines.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.001MFD	High side to point ◇A◇. Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig.4) to pin 11 of picture tube. Common to chassis.	A8	Adjust for MINIMUM deflection.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The channel oscillator adjustments are reached through a hole just to the right of the channel switch shaft.
The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point ◇A◇. Low side to chassis.	A9	Adjust to place sound marker as shown in Fig. 5. Video Marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A10	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A11	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A12	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A13	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A14	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A15	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A16	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A17	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A18	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A19	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A20	

ALIGNMENT INSTRUCTIONS (CONT.)

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (E). Low side to chassis.	A21, A22, A23	Adjust for response curve similar to Fig. 6 with markers above 90%.
9.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 6. If markers fall below 70% on any channel make slight compromise adjustments of A21, A22 and A23 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

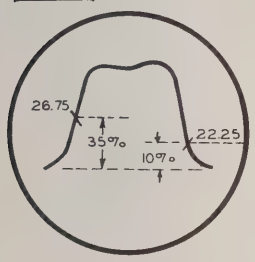


FIG. 1

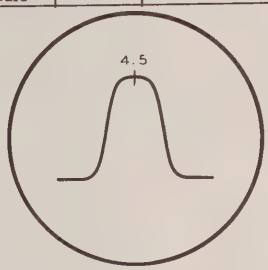


FIG. 2

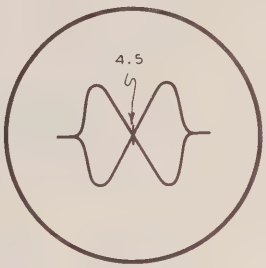


FIG. 3

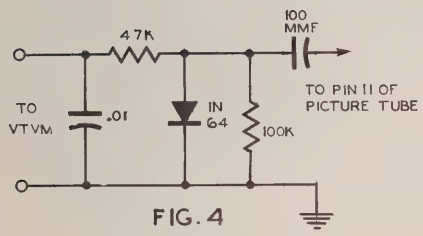


FIG. 4

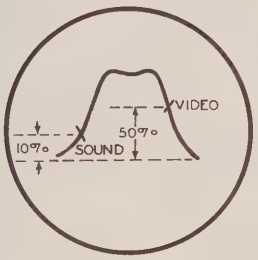


FIG. 5

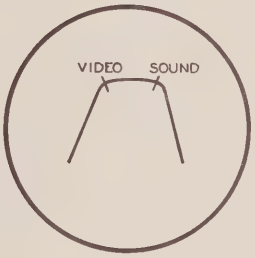
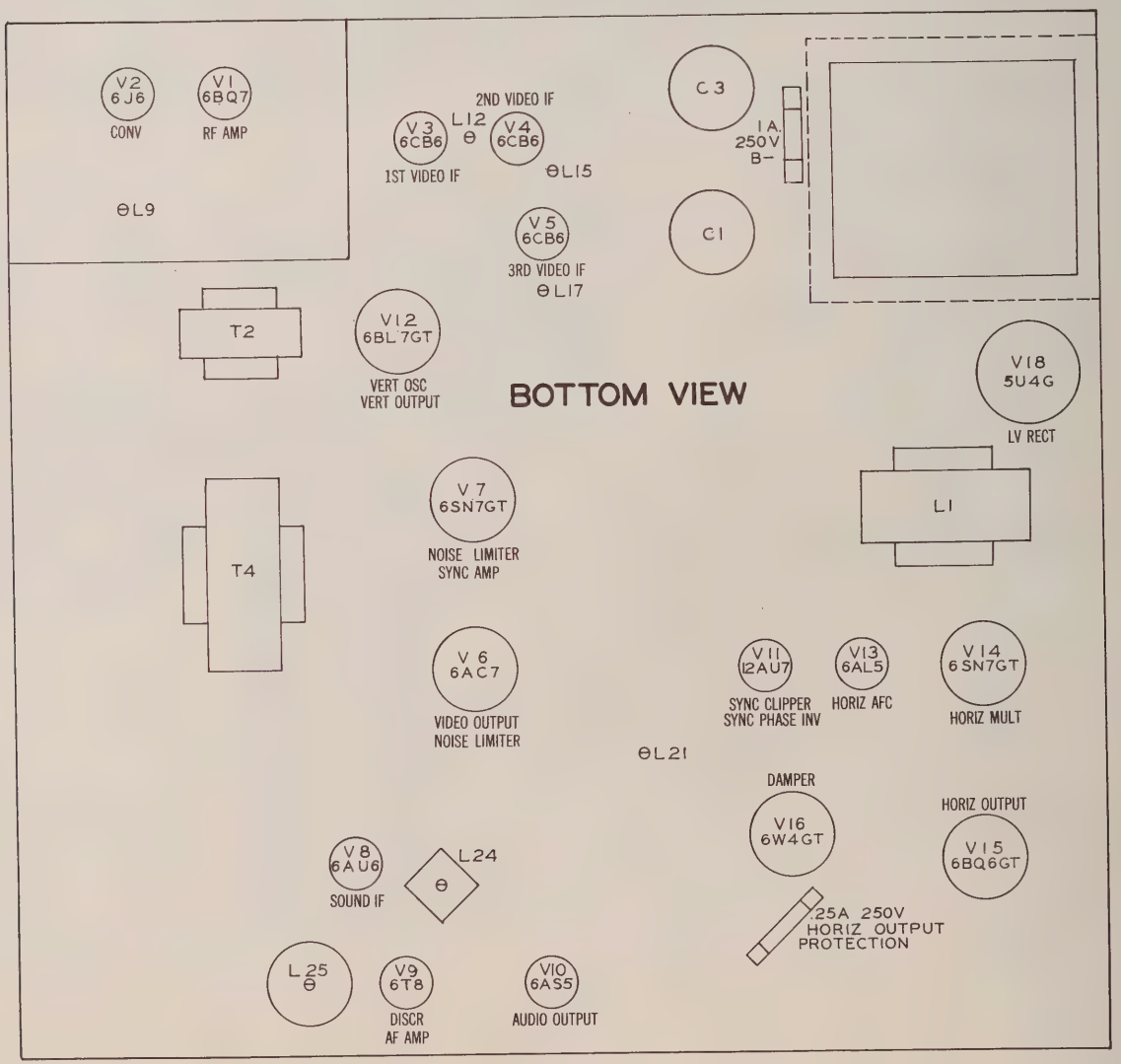


FIG. 6

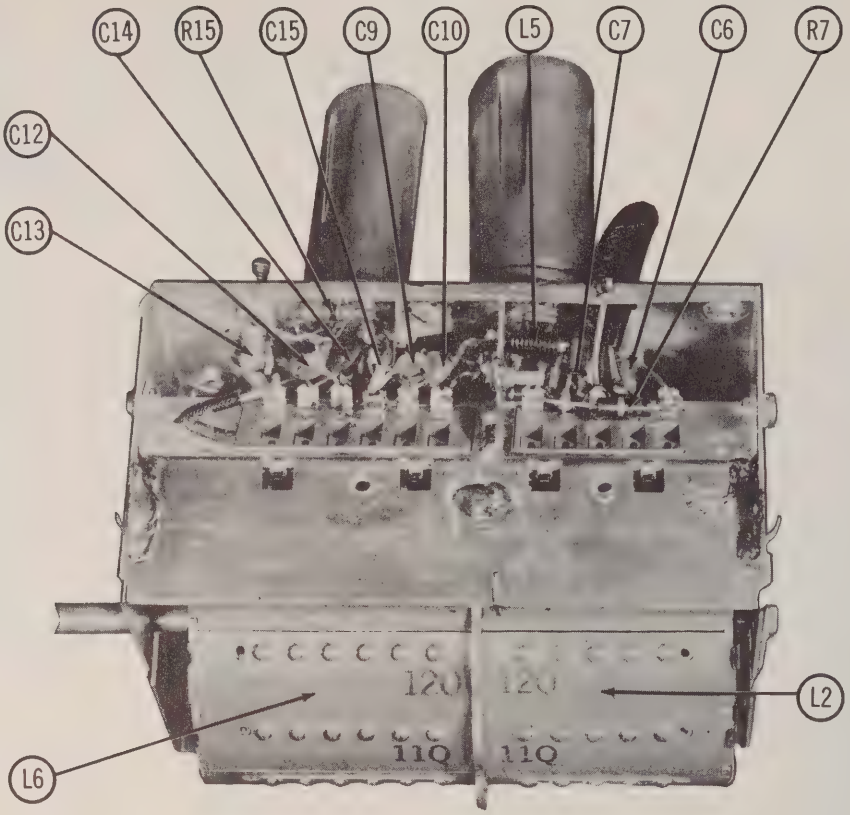
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	INF	615KΩ	0Ω	.1Ω	0Ω	#6.2KΩ	165KΩ	INF	0Ω
V 2	6J6	†10.3KΩ	†300Ω	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6CB6	569KΩ	68Ω	.1Ω	0Ω	†300Ω	† 300Ω	0Ω		
V 4	6CB6	577KΩ	47Ω	.1Ω	0Ω	†200Ω	†200Ω	0Ω		
V 5	6CB6	.1Ω	100Ω	.1Ω	0Ω	†100Ω	†100Ω	0Ω		
V 6	6AC7	0Ω	0Ω	140Ω	1 Meg	140Ω	#16KΩ	.1Ω	#4.1KΩ	
V 7	6SN7GT	568KΩ	#16KΩ	0Ω	2.2Meg	†68KΩ	0Ω	0Ω	.1Ω	
V 8	6AU6	470KΩ	0Ω	.1Ω	0Ω	†4.7KΩ	†4.7KΩ	82Ω		
V 9	6T8	INF	22KΩ	INF	.1Ω	0Ω	0Ω	0Ω	10 Meg	†470KΩ
V 10	6AS5	80KΩ	375KΩ	.1Ω	0Ω	375KΩ	#673Ω	#1.1KΩ		
V 11	12AU7	#680KΩ	†0Ω	†270KΩ	0Ω	0Ω	#11.5KΩ	#680KΩ	†3.9KΩ	.1Ω
V 12	6BL7GT	2 Meg	■3.5KΩ	920Ω	2.4Meg	■2.6Meg	0Ω	0Ω	.1Ω	
V 13	6AL5	27KΩ	27KΩ	0Ω	.1Ω	4.8Meg	0Ω	4.8Meg		
V 14	6SN7GT	5.2Meg	#3.4KΩ	1.5KΩ	100KΩ	#270KΩ	1.5KΩ	.1Ω	0Ω	
V 15	6BQ6GT	INF	.1Ω	INF	#12KΩ	470KΩ	470KΩ	0Ω	100Ω	Top Cap ■36Ω
V 16	6W4GT	■0Ω	INF	750KΩ	INF	#76Ω	■0Ω	■0Ω	■.1Ω	
V 17	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								Top Cap ■311Ω
V 18	5U4G	INF	13.5KΩ	INF	20.5Ω	.1Ω	19.5Ω	INF	13.5KΩ	
V 19	21AP4	0Ω	80KΩ	Pin 10 ■0Ω	Pin 11 240KΩ	Pin 12 .1Ω				

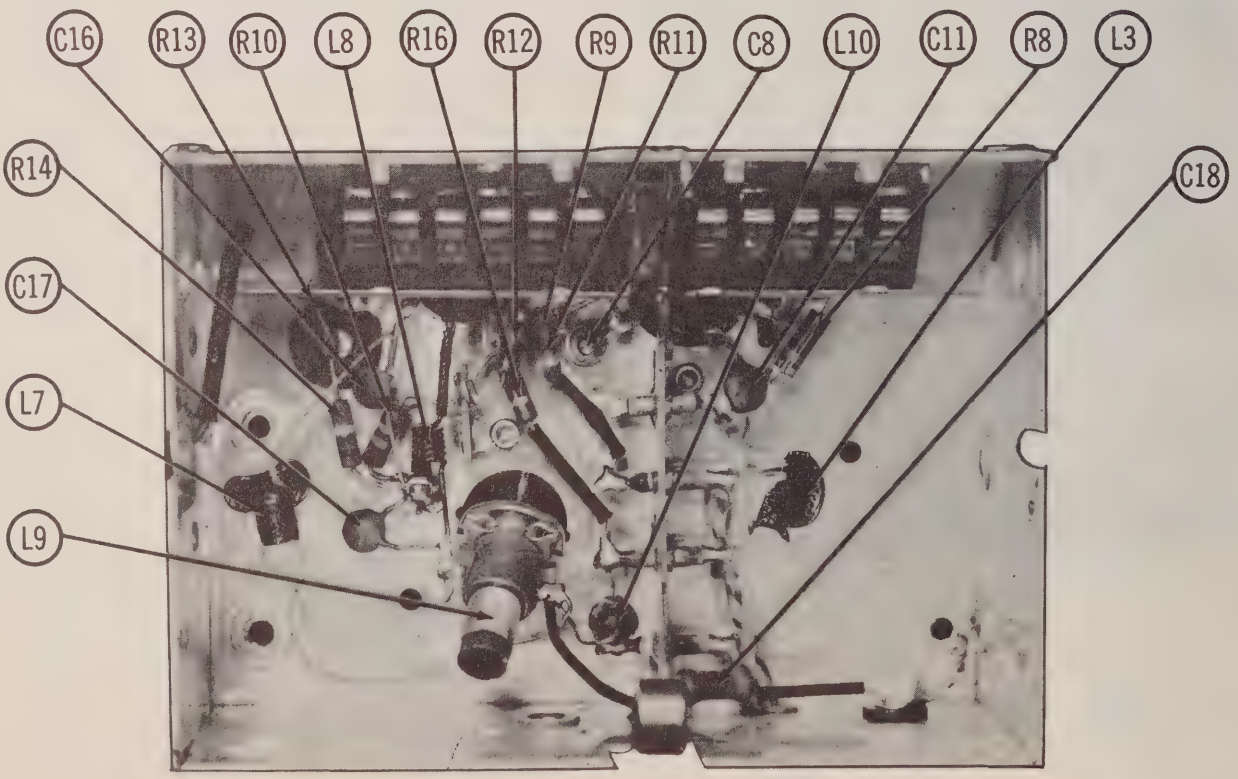
† MEASURED FROM PIN 1 OF V10
# MEASURED FROM PIN 8 OF V18
■ MEASURED FROM PIN 3 OF V16



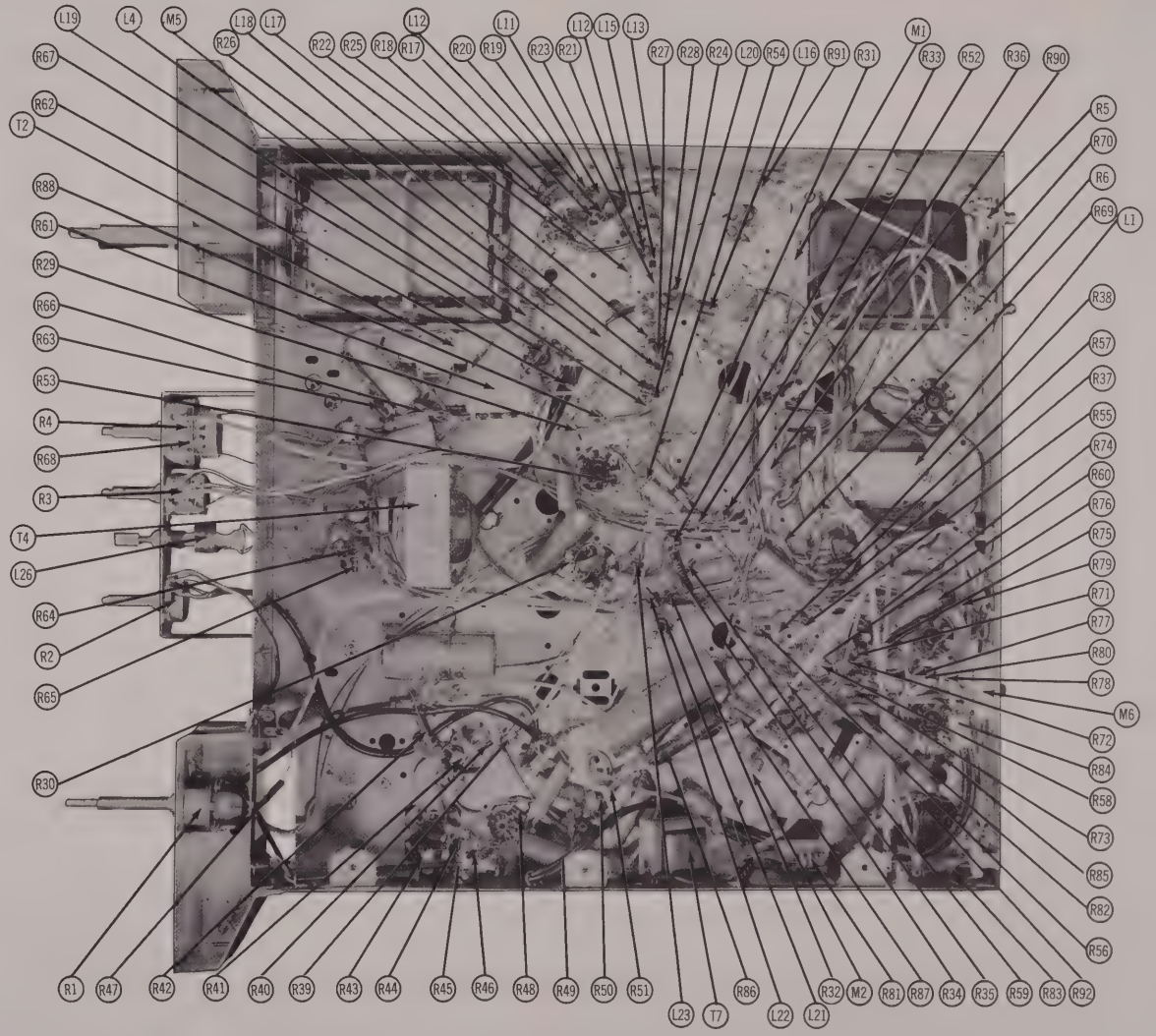
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Check waveform W13;

If not satisfactory,	If satisfactory,
Substitute V14 and check associated components.	Substitute V15 and V16. Check yoke and associated components.

INSUFFICIENT SWEEP

Check setting of drive control.

Check waveform W13;

If not satisfactory,	If satisfactory,
Substitute V14 and check associated components.	Substitute V15 and V16. Check associated components. Check C73 for open by disconnecting one end. Sweep should decrease slightly if capacitor if OK. Check C74 and C77 for open.

DRIVE LINES

Check setting of drive control (B1). Substitute V15 and V16. Check C4B and C77 for open.

COMPRESSED LEFT SIDE

Substitute V15 and V16. Check T3 and associated components.

FOLDS

Substitute V16. Check associated components.

XMAS TREE EFFECT

Substitute V14. Check C68 and C69. Check associated components.

VERTICAL

LOSS OF SWEEP

Check waveform at W7;

If not satisfactory,	If satisfactory,
Substitute V12. Check associated components.	Check vertical output transformer.

INSUFFICIENT SWEEP

Check amplitude of waveform at W7;

If not satisfactory,	If satisfactory,
Substitute V12 and check components. Check C4A for open.	Check T4. Substitute V12.

COMPRESSED AT BOTTOM

Check C60 for leaky condition. Check C3B in vertical output tube cathode for open.

COMPRESSED AT TOP, STRETCHED AT BOTTOM

If adjustment of height and vertical linearity control does not correct this condition, check C58 and C59 for open.

FOLDS

Substitute V12 and check C3B.

SYNC

HORIZONTAL

LOSS OF SYNC

Check waveform at W10;

If not correct,	If correct,
Substitute V7 and V11. Check circuit components.	Check waveform at W11;

Check waveform W11;

If not correct,	If correct,
Check feedback network (C64, C65, R74 & R81)	Substitute V13 and V14. Check a associated components. Particularly C68 and L26.

CRITICAL HOLD

Substitute V13 and V14. If no change is noted, follow procedure outlined under horizontal, loss of sync.

PULLING PICTURE

Check V13 and associated components.

VERTICAL

LOSS OF SYNC

Check waveform W6;

If not correct,	If correct,
Substitute V11. Check associated components and integrater.	Substitute V12 and check associated components.

CRITICAL SYNC

Substitute V7 and V11. Check C54 and C55.

TRIGGERING

Substitute V12.

VIDEO

SOUND BARS

Check adjustment of A5 (4.5MC trap). Check setting of local oscillator and alignment of IF stages.

POOR RESOLUTION

Check alignment of tuner and IF stages. Substitute V6 and check associated components.

SMEAR

Substitute V6 and check circuit components.

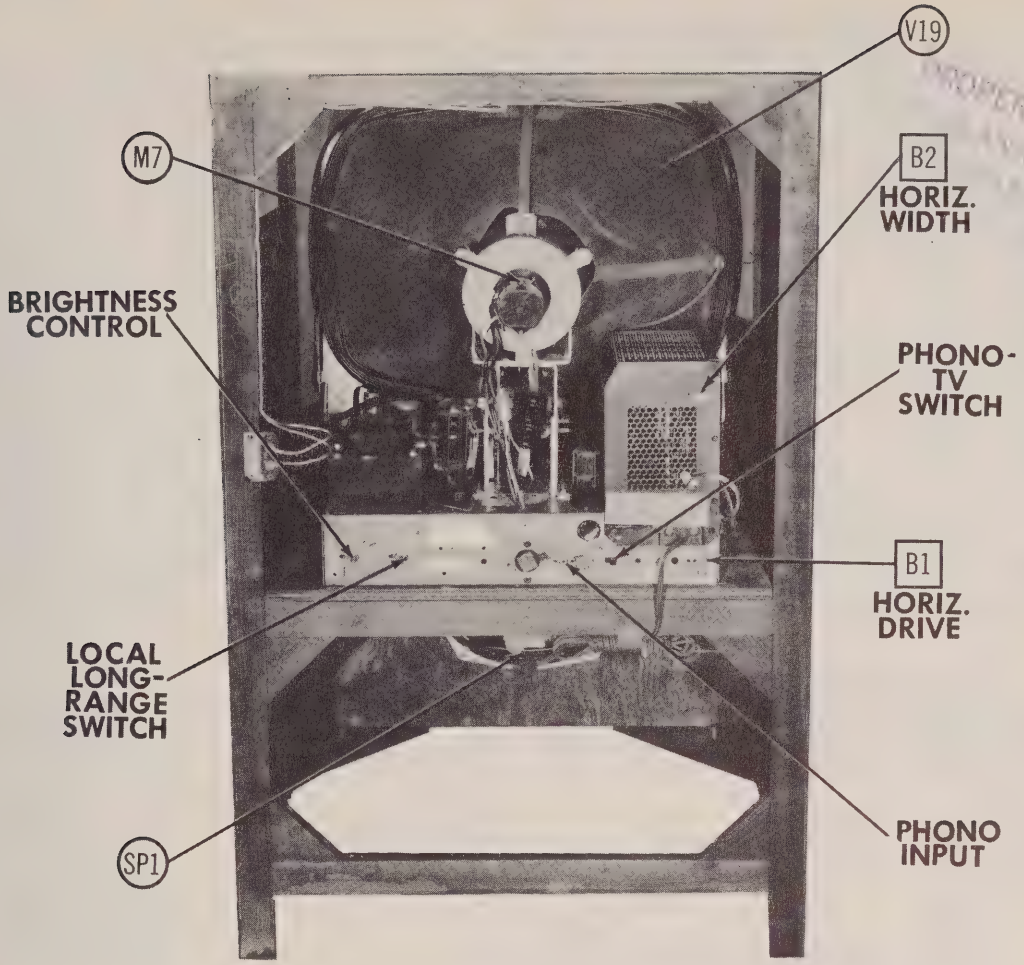
ONE WIDE BLACK BAR ACROSS THE PICTURE

Check tuner, IF and video amplifier tubes for leakage between filament and cathode.

POOR CONTRAST

Check waveform W2;

If distorted or weak,	If satisfactory,
Substitute V6 and check circuit components.	Check picture tube.



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal hold until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B1), counter-clockwise as far as possible without the presence of vertical white lines or compression of the center of the picture.

Adjust the width slug (B2) until the picture is slightly wider than enough to fill the picture mask horizontally.

AGC ADJUSTMENT

Tune to strongest TV signal available.

Adjust brightness and contrast controls for normal viewing.

Starting from maximum counter-clockwise position adjust AGC control clockwise until picture becomes unstable, then turn counter-clockwise just enought to eliminate the instability or bending of picture.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 7 wood screws. Remove rear cover.
3. Disconnect built-in antenna.
4. Remove 2 wood screws. Remove antenna bracket.
5. Disconnect speaker. Remove 4 speaker nuts. Remove speaker.
6. Remove 5 chassis bolts. Remove chassis.
   Note. Remove grd.wire to name plate before pulling chassis.

NOTE : FOR PICTURE TUBE REMOVAL IT IS NECESSARY TO REMOVE CHASSIS AS OUTLINED ABOVE.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE Part No.	STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1A	RF Amplifier	6BQ7	6BQ7	9AJ	
B	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Converter	6J8	6J8	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output - Noise Limiter	6AC7	6AC7	9A	
V7	Noise Limiter - Control - Sync Amplifier	6SN7GT	6SN7GT	8BD	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Detector - AF Amplifier	6T8	6T8	9E	
V10	Audio Output	6A85	6A85	7CV	
V11	Sync Clipper - Sync Phase Inv.	12AU7	12AU7	9A	
V12	Vert. Oscillator - Vert. Output	6BL7GT	6BL7GT	8BD	Series "E" used 6C4 Vert. Osc. 6S4 Vert. Output
V13	Horiz. AFC	6AL5	6AL5	6BT	
V14	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V15	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V16	Damper	6W4GT	6W4GT	4CG	
V17	HV Rectifier	1B3GT	1B3GT	1C	
V18	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: SILVERTONE Part No.	SYLVANIA Part No.	RTMA BASE TYPE	NOTES
V19	21AP4	21AP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: SILVERTONE Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C1A	▲40	450	530434	AFH3-44		C035		FP377	TVL-3787	
B	▲40	450								
C	▲40	250								
C2	40	300	160095	PR8450/40		BR4035		TC7B	TVA-1611	
C3A	▲80	250	509002	AFH3-142		B060		FP375	TVL-3722	
B	▲100	50								
C4A	20	450	530641	PR8450/30-20		BRD2245		TCD75	TVA-2730	Orange Plain
B	10	450								
C5	10	150	505174	PR8150/13		BR1015		TC42	TVA-1406	
C6	3-9		509064		829-10					
C7	3.8		530721				NP0K-3R6			
C8	.5-3		507968		829-3			CT565A		
C9	47		520719	BPD-000047	D6-470	TM5Q6	GP1K-470	UC-5447	5GA-Q47	
C10	1.5		520720	BPD-001R5	TCZ-1.5		NP0K-1R5		5TCC-V15	
C11	1000		520735	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C12	47		520719	BPD-000047	D6-470	TM5Q6	GP1K-470	UC-5447	5GA-Q47	
C13	.5-3		507968		829-3			CT565A		
C14	10		520718	SI10N750	TCN-10			N750K-100	NT-541	5TCU-Q1
C15	5		520717	SI5NP0	TCZ-5			NP0K-050	ZT-555	5TCCB-V47
C16	1000		520735	BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	
C17	6.8		520716	SI6.8NP0	TCZ-6.8			NP0K-6R8	ZT-5468	5TCCB-V68
C18	120		513029	SI120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C19	82		513016	SI82	D6-820		GP1K-820		5GA-Q82	
C20	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C21	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C22	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C23	82		513016	SI82	D6-820		GP1K-820		5GA-Q82	
C24	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C25	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C26	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C27	82		513016	SI82	D6-820		GP1K-820		5GA-Q82	
C28	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C29	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C30	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C31	.25	200	512045	P488-25		P2P25		PT4025	2TM-P25	
C32	.1	200	512033	P288-1	DF-104	P2P1		PT401	2TM-P1	
C33	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C34	.22	400	512223	P488-22	TCZ-47	PTE4P22		PT4025	2TM-P23	
C35	47		513438	SI47NP0				ZT-5447	5TCC-Q47	
C36	.1	400	512035	P488-1	DF-104	PTE4P1		PT401	4TM-P1	
C37	.02	600	512018	P688-02	DF-203	PTE6S3		PT615	6TM-S2	
C38	.05	600	512031	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C39	2.2		513001		TCZ-2.2		NP0K-2R2		5TCCB-V22	
C40	47		512002	SI47	D6-470	TM5Q6	GP1K-470	UC-5447	5GA-Q47	
C41	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C42	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C43	1500		513010	SI1500	D6-152	TM5D15	GP2L-152	UC-5315	5HK-D15	
C44	1500		513010	SI1500	D6-152	TM5D15	GP2L-152	UC-5315	5HK-D15	
C45	1500		513010	SI1500	D6-152	TM5D15	GP2L-152	UC-5315	5HK-D15	
C46	.05	200	512037	P288-05	DF-503	PTE2S5		PT415	2TM-S5	
C47	.005	600	512007	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C48	.005	600	512007	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C49	270		513006	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C50	.01	400	512011	P488-01	D6-103	PTE4R1	GP2-333-103	PT411	4TM-R1	
C51	.01	200	512009	P488-01	D6-103	PTE4R1	GP2-333-103	PT411	4TM-R1	
C52	.005	600	512007	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C53	270		513006	SI270	D6-271		GP2K-271	UC-5327	5GA-T27	
C54	.01	600	512013	P688-01	D6-103	PTE6R1	GP2-333-103	PT611	6TM-R1	
C55	.05	400	512029	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C56A	.01			P688-01		PTE6R1		PT611		
B	2000		+508063	P688-002	*DD-103	TM5D2	†821-01	DC-522	‡5HK-S1	
C	5000			BPD-005	PC-100	TM5D5	1405-01	DC-525	5HC1	
D	5000			BPD-005		TM5D5		DC-525		

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: SILVERTONE Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C57	4700	500	512533	1464-005		1DR5D5		MCB465	MS-25	
C58	.02	400	512019	P488-02	DF-203	PTE4S2		PT412	4TM-S2	
C59	.05	600	512306	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C60	.1	600	512037	P688-1	DF-104	PTE6P1		PT601	6TM-P1	
C61	.05	600	512037	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C62	.001	600	512001	P688-001	DD-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C63	.001	600	512001	P688-001	DD-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C64	.01	200	512009	P488-01	D6-103	PTE4S1	GP2-333-103	PT411	4TM-S1	
C65	.05	600	512031	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C66	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C67	.05	400	512027	P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C68	3900	500	512540	1464-004		1DR5D4		MCB463	MS-24	
C69	390	500	512535	1469-0004		5R5T4		MCB243	MS-34	
C70	.25	600	512049	684-25		PTE6P25		PT625	6TM-P25	
C71	390	500	512535	1468-0004		5R5T4		MCB243	MS-34	
C72	1000	500	512515	1468-001	D6-102	1W5D1	GP2L-102	MC255	1FM-21	
C73	5.1	1500	513028					PC5510		
C74	.05	600	512031	P688-05	DF-503	PTE6S5		PT615	6TM-S5	
C75	.25	200	512045	P488-25		P2P25		PT4025	2TM-P25	
C76	.25	200	512045	P488-25		P2P25		PT4025	2TM-P25	
C77	.02	600	512019	P688-02	DF-203	PTE6S2		PT612	6TM-S2	
C78	56	1500	513027							
C79	500	20000	508888		HV20C	TV3-502	MM-C20T5	413-501		20DK-T5
C80	500	20000	508888		HV20C	TV3-502	MM-C20T5	413-501		20DK-T5
C81	5000		513013	BPD-005	DD-502	TM5D5	81L-005	DC-525	5HK-D5	
C82	.01	400	512255	+89ZGXY-01		PT681		PT411	4TM-S1	
C83	.01	400	512255	+89ZGXY-01		PT681		PT411	4TM-S1	
C84	5		513432	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	
C85	82		513016	SI82	D6-820		GP1K-820		5GA-Q82	
C86	5		513432	SI5NP0	TCZ-4.7		NP0K-050	ZT-555	5TCCB-V47	

* Items C56A, C56B, C56C, C56D, R61A, R61B, R61C are combined in one unit.
* Install DD-103 in series with PC-100 input lead to replace original unit.
† Install 821-01 in series with 1405-01 input lead to replace original unit.
‡ Install 5HK-S1 in series with 10IC1 input lead to replace original unit.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA: SILVERTONE Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	750Ω	2	530222	Q7-341 *			WF751	Contrast-Wire Wound-Panel
B	1Meg	1					UR16-725	Volume-Taper ② 300KΩ-Rear
C	Switch						US-36	Attach to R1B
R2A	500KΩ	1	520681	Q1L-133	AG-58-8	AB-59	U-50	Tone
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R2A
R3A	2.5Meg		508888	Q7-223**	RTV-313		UF255L	Height-Panel
B	1Meg						UR16L	Vert. Hold- Rear
R4A	10KΩ	4	509308		RTV-341			Focus-Wire Wound-Panel
B	5000Ω							Vert. Linearity-Rear
R5A	100KΩ		520652	Q1L-128	AG-49-8	AB-49	SU-41	Brightness
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	30KΩ		520653	Q1L-131				Range Booster-Panel
B	30KΩ			M1L-131				Range Booster- Rear

* CONCENTRIKIT EQUIVALENT- KIT K-3, BASE ELEMENTS & SHAFTS W1T-105 & P3-131 (Panel) B13-137X & R1-226 (Rear) & SWITCH 76-1.
** CONCENTRIKIT EQUIVALENT- KIT K-2, BASE ELEMENTS & SHAFTS B1L-239 & P1-112 (Panel) B1L-137 & R1-115 (Rear).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: SILVERTONE Part No.	IRC Part No.	NOTES
R7	15KΩ	½	510157	BTS-15K	
R8	47KΩ	½	510167	BTS-47K	
R9	100KΩ	½	510172	BTS-100K	
R10	160KΩ-5%	½	510774	BTS-160K-5%	
R11	1500Ω	½	510139	BTS- 1500	
R12	150KΩ-5%	½	510781	BTS-150K-5%	
R13	10KΩ	½	510154	BTS-10K	
R14	220KΩ	½	510179	BTS-220K	
R15	10KΩ	½	510154	BTS-10K	
R16	10KΩ	½	510154	BTS-10K	
R17	12KΩ-5%	½	510723		
R18	68Ω	½	510116		
R19	390Ω	½	510129	BTS-390	
R20	8200Ω	½	510153		
R21	47Ω	½	510112		
R22	100Ω	½	510119	BTS-100	
R23	6800Ω	½	510151	BTS-6800	Note 3
R24	100Ω	½	510118	BTS-100	
R25	100Ω	½	510119	BTS-100	
R26	100Ω	½	510119	BTS-100	
R27	18KΩ	½	510159	BTS-18K	
R28	8200Ω	½	510153	BTS-8200	
R29	560KΩ	½	510186	BTS-560K	
R30	1 Meg	½	510191	BTS-1 Meg	
R31	10KΩ	2	510354	BTB-10K	
R32	18KΩ	½	510159	BTS-18K	Note 1
R33	10KΩ	½	510154	BTS-10K	
R34	4000Ω	½	510753	1 3/4A-4000	
R35	470KΩ	½	510184	BTS-470K	
R36	470KΩ	½	510184	BTS-470K	
R37	22KΩ	½	510160	BTS-22K	
R38	2200Ω	½	510142	BTS-2200	
R39	18KΩ	½	510159	BTS-18K	
R40	470KΩ	½	510184		
R41	82Ω	½	510117	BTS-82	
R42	4700Ω	1	510249	BTA-4700	
R43	220Ω	½	510124	BTS-220	
R44	18KΩ	½	510159	BTS-18K	
R45	220Ω	½	510124	BTS-220	
R46	22KΩ	½	510160	BTS-22K	

RESISTORS (CONT.)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: SILVERTONE Part No.	IRC Part No.	NOTES
R47	68KΩ	½	510170	BTS-68K	
R48	10Meg	½	510197	BTS-10Meg	
R49	470Ω	½	510164	BTS-470K	
R50	680KΩ 5%	½	510746	BTS-680K-5%	
R51	820KΩ 5%	½	510747	BTS-820K-5%	
R52	270KΩ	½	510180	BTS-270K	
R53	2.2Meg	½	510193	BTS-2.2Meg	
R54	68KΩ	½	510169	BTS-68K	
R55	270KΩ	½	510180	BTS-270K	
R56	680KΩ	½	510187	BTS-680K	
R57	3900Ω 5%	½	510748	BTS-3900-5%	
R58	680Ω	½	510151	BTS-680	
R59	4700Ω 5%	½	510750	BTS-4700-5%	
R60	27KΩ	½	510162	BTS-27K	
R61A	22KΩ	½		BTS-22K	
B	8200Ω	½	+508062	BTS-8200	
C	8200Ω	½		BTS-8200	
R62	2Meg 5%	½	510769	BTS-2Meg-5%	Notes 2&4
R63	1.5Meg 5%	½	510767	BTS-1.5Meg-5%	
R64	100KΩ	½	510766	BTS-100K	
R65	4.7Meg	½	510768	BTS-4.7Meg	Note 5
R66	6800Ω	½	510151	BTS-6800	
R67	2Meg	½			Note 6
R68	680Ω	½	510134	BTS-680	
R69	560Ω	½	510152	BTS-560	
R70	560Ω	½	510152	BTS-560	
R71	100KΩ 5%	½	510751	BTS-100K-5%	
R72	100KΩ 5%	½	510751	BTS-100K-5%	
R73	4.7Meg	½	510195	BTS-4.7Meg	
R74	27KΩ	½	510183	BTS-27K	
R75	470KΩ	½	510184	BTS-470K	
R76	3300Ω	½	510145	BTS-3300	
R77	1500Ω	½	510139	BTS-1500	
R78	100KΩ	½	510172	BTS-100K	
R79	270KΩ	½	510180	BTS-270K	
R80	680KΩ	½	510187	BTS-680K	
R81	4700Ω	2	510248	BTB-4700	
R82	15KΩ	2	510257	BTB-15K	
R83	470KΩ	½	510184	BTS-470K	
R84	68Ω	½	510116		

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: SILVERTONE Part No.	IRC Part No.	NOTES
R85	100Ω	1	510218	BTA-100	
R86	12KΩ	5	510758	1-3/4A-12K	
R87	2700Ω	2	510344	BTB-2700	
R88	47KΩ	1		BTS-47K	
R89	1Meg	2	510890		
R90	600Ω	10	510741	1-3/4A-600	
R91	4000Ω	3	510783	1-3/4A-4000	
R92	220KΩ	½	510179	BTS-220K	

* Items R61A, R61B, R61C, C56A, C56B, C56C, C56D are combined in one unit.
Note 1. Chassis containing an "A" in series designation use a 12KΩ resistor in this application.
Note 2. Chassis containing a "C" in series designation use a 1.5Meg resistor in this application.
Note 3. Chassis containing a "D" in series designation use a 4700Ω (5%) resistor in this application.
Note 4. Chassis containing an "E" in series designation use a 1.5Meg resistor in this application.
Note 5. Chassis containing an "E" in series designation R65 is omitted.
Note 6. Some Models use a 2.2Meg resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA: SILVERTONE Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	TRIAD Part No.
T1	117VAC @ 1.86A	665VCT @ .250ADC	5VAC @ 3A	6.3VAC @ 6.7A SEC. 4 6.3VAC @ 1.12A	520687		P-3078	TP-356	R-39BC

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA: SILVERTONE Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	TRIAD Part No.	NOTES
T2	153Ω	940Ω	508076	A-8125	A-3000 ①	TBO-1 ②	A-97X	Vert. Osc. Trans.
T3	311Ω tap ③ 36Ω	4Ω tap ④ .4Ω, 3.2Ω SEC. 2 0Ω	520489	A-8130 ③	HVO-7 ④	TFB-5 ⑤, ⑥	D-14 ⑦	Horiz. Output Trans.
T4	800Ω tap ⑨ 8Ω		509375	A-8123 ①	A-3037	TSO-5 ⑧	A-102X	Vert. Output Trans.
T5A	16Ω		115228 ⑩	DY-9	MDF-70 ⑩	TY-3	Y-17 ⑪	Horiz. Deflection Coils
B	48Ω							Vert. Deflection Coils
T6	12KΩ		162326 ⑫					Focus Coil

① Drill one new mounting hole.
② Mount on top of chassis.
③ Use with Width Coil WC-5.
④ Use with Width Coil MWC-1.
⑤ Drill new mounting holes.
⑥ Use Width Coil (with AGC winding) with approx. 4-29 Millihenry range.
⑦ Use with Width Coil WC-11.
⑧ Connect as Auto Trans.
⑨ Includes cable & plug.
⑩ Disconnect MDF-70 shunting resistors and capacitor.
⑪ Disconnect Y-17 shunting resistors and capacitor.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA: SILVERTONE Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	TRIAD Part No.	NOTES
T7	4.3KΩ	3Ω	450Ω	.9Ω	509376 509378 ①	A-3877 ①	A-2930	RO-8 ①	S-5X	① Alternate audio output. ② Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V C IMP	REPLACEMENT DATA: SILVERTONE Part No.	JENSEN Part No.	QUAM Part No.	NOTES
SP1	6 x 9"	PM	3Ω	508174	ST-810 Mod. P69-V	69A2	

FILTER CHOKE

ITEM No	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 (%)	REPLACEMENT DATA: SILVERTONE Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	TRIAD Part No.
L1	.250ADC	73Ω	2.9 Hy.	508341	C-2325	C-2091 ①	TH-3300 ①	

① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: SILVERTONE Part No.	MILLER Part No.	MEISSNER Part No.	NOTES
L2	Ant. Coil	0Ω	0Ω	520702			
L3	Fil. Choke	0Ω		520518			
L4	Fil. Choke	0Ω		507584			
L5	Neutralizing Coil	0Ω		520701			
L6	RF, Mixer Grid & Osc.	0Ω		520722			
L7	Fil. Choke	0Ω		520520			
L8	RF Choke	0Ω		520714			
L9	1st. Video IF	.9Ω		520734			
L10	RF Choke	1.2Ω		520715	6189 *	17-1004 *	Includes slug, slug part# 509063
L11	Fil. Choke	0Ω		507584			
L12	2nd. Video IF	.1Ω		507343			
L13	Fil. Choke	0Ω		507584	6189 *	17-1004 *	Less slug, slug part #507357

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PARTS LIST AND DESCRIPTIONS (Continued)

COILS (CONT.)

ITEM No.	USE	DC RES.		REPLACEMENT DATA			NOTES
		PRI.	SEC.	SILVERTONE PART No.	MILLER PART No.	MEISSNER PART No.	
L14	RF Choke	2.2Ω		507367			
L15	3rd. Video IF	.1Ω		507343	6188 *	17-1003 *	Less slug, slug part # 507357
L16	Fil. Choke	0Ω		507584			
L17	4th. Video IF	.1Ω		507343	6189 *	17-1004 *	Less slug, slug part # 507357
L18	RF Choke	2.2Ω		507367			
L19	Series Peaking Coil	16Ω		509340 ▲			580 Microhenries
L20	Shunt Peaking Coil	6.5Ω		509342 †	4648	19-1923	394 Microhenries
L21	4.5 MC Trap	1.8Ω		509603	1470	20-1004	Includes slug, slug part # 507357
L22	Series Peaking Coil	9.5Ω		509341 ▲	6181	19-3250	254 Microhenries
L23	Shunt Peaking Coil	6.5Ω		509342	4648	19-1923	394 Microhenries
L24	Sound IF	1.4Ω		509378	1470-A	17-1031 ǂ	
L25	Ratio Det.	3.8Ω	.7ΩCT	509706	6205 **	17-3493	Teriary Winding .45Ω
L26	Horiz. Osc.	85Ω		508967	6210	19-1576	Includes slug, slug part # 508963
L27	Width Coil	1.3Ω		509361			Includes slug, slug part # 507429

* Enlarge mounting hole.
▲ Chassis containing a "G" in series designation use part #520620 in this application.
† Chassis containing a "G" in series designation use part #520985 in this application.
▲ Chassis containing a "A" in series designation use part #520689 in this application.
■ Part number applies to uncoded chassis, chassis containing a "A" in series designation, use part #509340 & chassis containing a "G" in series designation use part #520342 in this application.
ǂ Drill mounting holes.
** Use adaptor plate.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SILVERTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG (P/T)	1A 250V	509517		318001		GJV-1	
M2	3AG (P/T)	1/4A 250V	508063		318.250		GJV-1/4	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					SILVERTONE PART No.		
M3	Bayonet	6-8	.15	Brown	118921		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M4	RF Tuner	W520645	Complete
M5	Crystal	509386	Video Detector (1N64)
M6	Switch	520563	Phono-TV Selector (DPDT Slide)
M7	Ion Trap	509688	
B1	Trimmer	520127	Horiz. Drive 25-280MMF
	Ant. Coil	520703	Channel 3
	Ant. Coil	520704	Channel 4
	Ant. Coil	520705	Channel 5
	Ant. Coil	520706	Channel 6
	Ant. Coil	520707	Channel 7
	Ant. Coil	520708	Channel 8
	Ant. Coil	520709	Channel 9
	Ant. Coil	520710	Channel 10
	Ant. Coils	520711	Channel 11
	Ant. Coils	520712	Channel 12
	Ant. Coils	520713	Channel 13
	RF, Mixer Grid & Osc. Coil	520723	Channel 3
	RF, Mixer Grid & Osc. Coil	520724	Channel 4
	RF, Mixer Grid & Osc. Coil	520725	Channel 5
	RF, Mixer Grid & Osc. Coil	520726	Channel 6
	RF, Mixer Grid & Osc. Coil	520727	Channel 7
	RF, Mixer Grid & Osc. Coil	520728	Channel 8
	RF, Mixer Grid & Osc. Coil	520729	Channel 9
	RF, Mixer Grid & Osc. Coil	520730	Channel 10
	RF, Mixer Grid & Osc. Coil	520731	Channel 11
	RF, Mixer Grid & Osc. Coil	520732	Channel 12
	RF, Mixer Grid & Osc. Coil	520733	Channel 13

TROUBLE SHOOTING AIDS — CONT.

AUDIO

WEAK OR NO SOUND

Substitute V8, V9 and V10. Check circuit acomponents. Check alignment of sound and video IF.

BUZZ

Adjust discriminator secondary for minimum buzz. Substitute V9. Check local oscillator setting. Check for overload at waveform W1. If overloading exists, check AGC network.

DISTORTED

Check audio stages using audio signal generator;

If not distorted,	If distorted,
Check alignment of sound IF and discriminator.	Substitute V9 and V10. Check associated components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check waveform W13;

If not satisfactory,	If satisfactory,
Substitute V14. Check associated components. Check C76 for open.	Substitute V15, V16 and V17. Check fuse in horizontal output primary. Check T3, L27 and other components. of circuit.

WEAK HIGH VOLTAGE

If substitution of V14, V15 and V17 does not correct trouble, follow procedure outlined under loss of high voltage.

BLOOMING

If substitution of V14, V15, V17 and V18 does not correct the trouble, follow procedure outlined under loss of high voltage. Check R89 particularly.

POWER

SMALL RASTER AND WEAK SOUND

Substitute V18. Check filter components. Check B plus circuit for short.

DIM PICTURE

Substitute V18 and check B plus components.

GENERAL

NO SOUND, NO PICTURE, NO SNOW

Substitute V2, V3, V4, V5, V6 and V7. Check associated components.

SNOW BUT NO PICTURE OR SOUND

Substitute V1 and V2. Check associated components.

SNOWY PICTURE, GOOD SOUND (IN STRONG SIGNAL AREAS)

Check video IF tubes and components.

INTERMITTENT STREAKS

Check high voltage circuit for corona leakage and arcing.

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MODEL 2D1303A

TRUETONE
MODEL 2D1303A

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TRUETONE
MODEL 2D1303A

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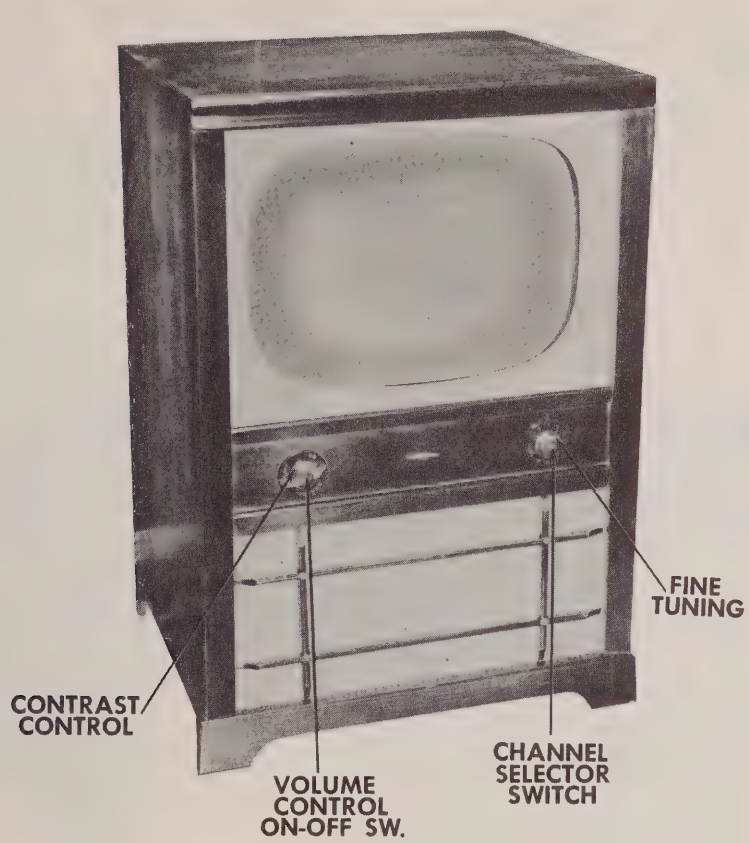

TRUETONE
MODEL 2D1303A

TRADE NAME	Truetone Model 2D1303A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	Twenty-one
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.52 Amp. @ 117 Volts AC
TUNING RANGE-	Channels 2 thru 13, Video IF 26.2MC, Sound IF 21.7MC (Intercarrier)

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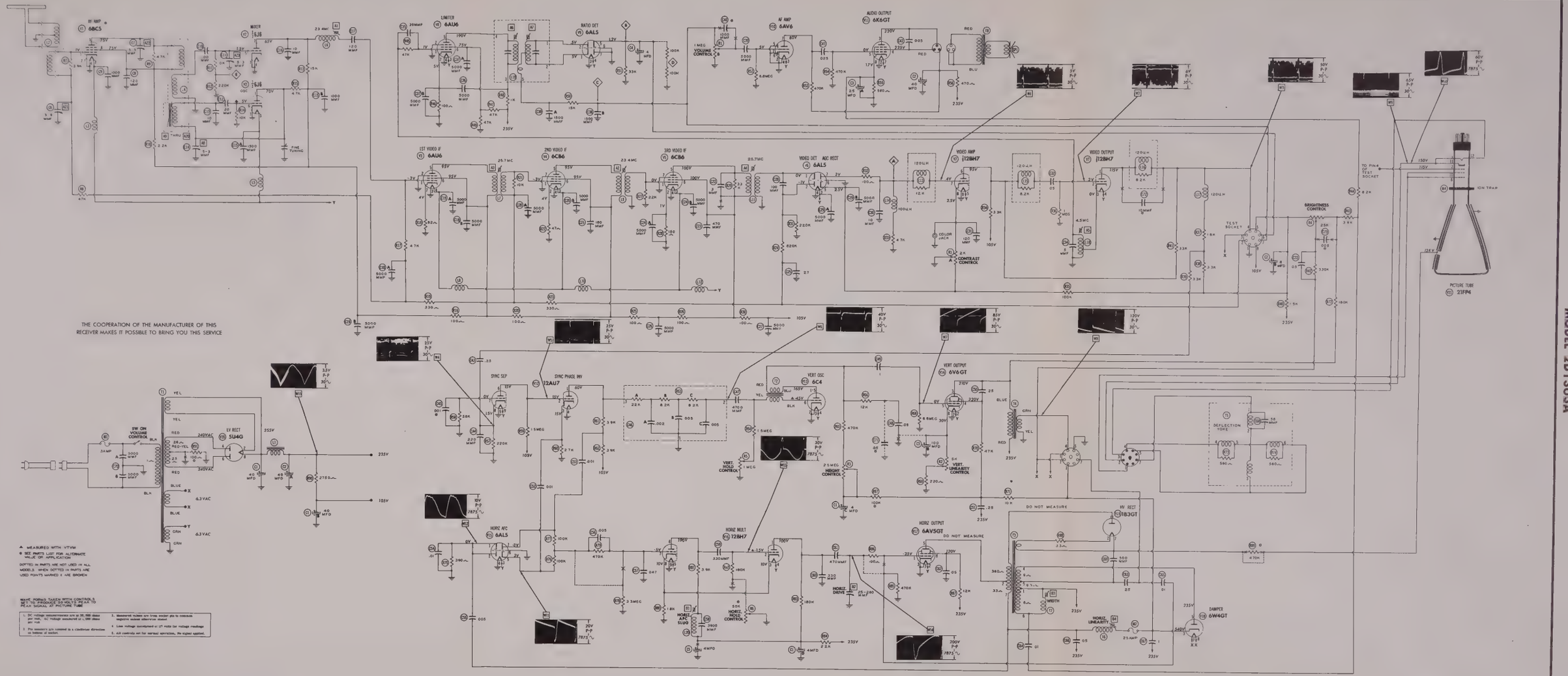
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
RF AMP 6BC5
MIXER 6J6
LIMITER 6AU6
RATIO DET 6AL5
AF AMP 6AV6
AUDIO OUTPUT 6K6GT
1ST VIDEO IF 6AU6
2ND VIDEO IF 6CB6
3RD VIDEO IF 6CB6
VIDEO DET AGC RECT 6AL5
VIDEO AMP 12BH7
VIDEO OUTPUT 12BH7
SYNC SEP
SYNC PHASE INV 12AU7
VERT OSC 6C4
VERT OUTPUT 6V6GT
HORIZ AFC 6AL5
HORIZ MULT 12BH7
HORIZ OUTPUT 6AV5GT
HV RECT 1B3GT
DAMPER 6W4GT
PW RECT 5U4G
SW ON VOLUME CONTROL
VOLUME CONTROL
CONTRAST CONTROL
BRIGHTNESS CONTROL
HEIGHT CONTROL
VERT. LINEARITY CONTROL
VERT. HOLD CONTROL
HORIZ. HOLD CONTROL
HORIZ. AFC SLUG
HORIZ DRIVE
HORIZ. LINEARITY
WIDTH
DEFLECTION YOKE
TEST SOCKET
TO PIN 4 OF TEST SOCKET
ION TRAP
PICTURE TUBE 21FP4
DO NOT MEASURE
240VAC
6.3VAC
235V
105V
150V
125V
12V
A MEASURED WITH VTVM
B SEE PARTS LIST FOR ALTERNATE VALUE OF APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 10 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements are at 30,000 ohms per volt, AC voltage measured at 1,000 ohms per volt.
2. The resistors are counted in a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation, No signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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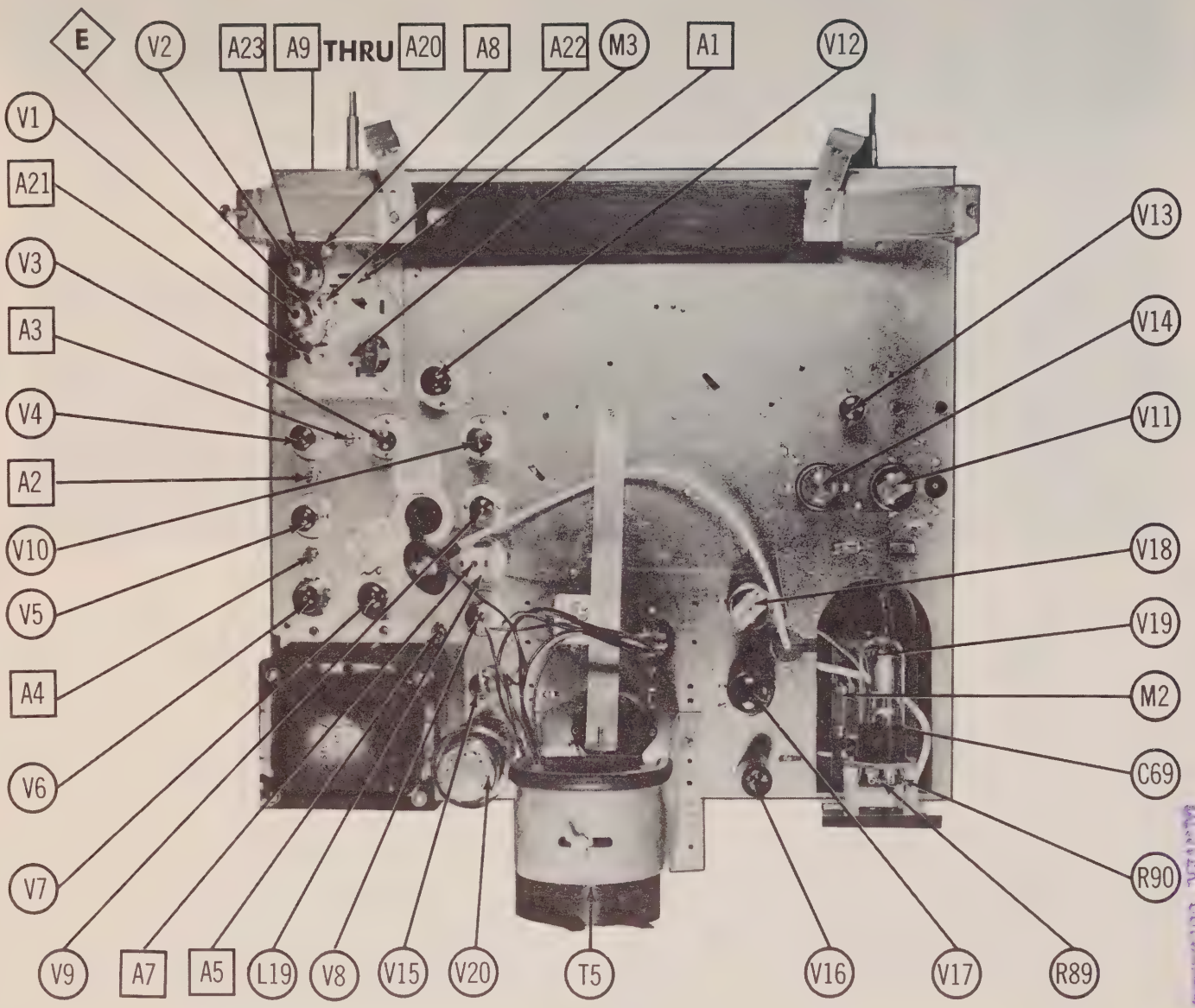
TRUETONE
MODEL 2D1303A

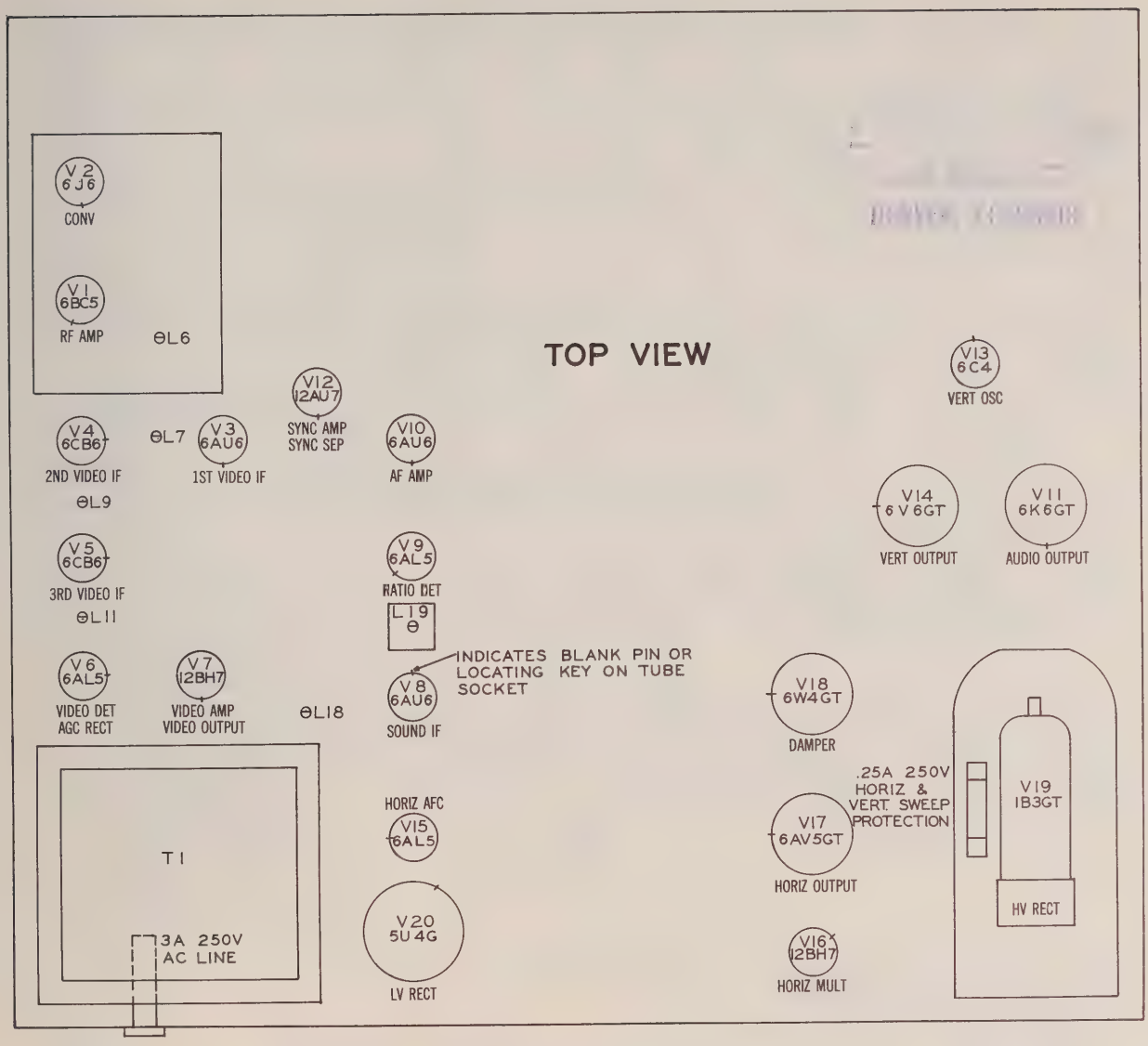


CHASSIS TOP VIEW

PROPERTY OF
L. F. E. FRANKENSHIP
1004 MAPLE ST.
BOULDER, COLORADO

CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V7
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V21
Has pic, no sound - V8, V9, V10, V11

SYNC FAILURE
No vert. sync - V12, V13
No horiz. sync - V12, V15, V16
No vert. or horiz. sync - V12

SWEEP FAILURE
No raster, has sound - V16, V17, V19, V18, V21, Fuse (M2)
No vert. deflection - V13, V14
Poor vert. linearity or foldover - V13, V14
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17, V18, V19, V20
Vert. off freq. - V12, V13
Horiz. off freq. - V12, V15, V16

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube, V2, from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C25. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23.4MC (Unmod)	Any	DC probe to point (A). Common to chassis.	A1, A2	Adjust for maximum deflection. Attenuate generator to maintain less than 2 volts at VTVM.
2.	"	"	25.7MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.7MC 23MC 26.2MC	Any	Vert. Amp. to point (A). Low side to chassis.		Check for response curve similar to Fig. 1. If necessary retouch A1 thru A4 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.
Set contrast control at maximum contrast position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common to chassis.	A5, A6	Adjust for maximum deflection.
5.	"	"	"	"	DC probe to point (C). Common to point (D).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A5, A6	Disconnect stabilizer capacitor C4. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
5.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A7	Re connect capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Connect bias battery as under Video IF Alignment.
Complete oscillator alignment may not be necessary.
If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A8. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel.
If adjustment of A8 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (A). Low side to chassis.	A9	Adjust to place video marker at 50% on low frequency slope of response curve as in Fig. 4.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A10	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A11	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A12	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A13	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A14	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A15	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A16	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A17	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A18	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A19	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A20	

ALIGNMENT INSTRUCTIONS (CONT.)

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (E). Low side to chassis.	A21 A22 A23	Adjust for response curve similar to Fig. 5.
8.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 5. If markers fall below 70% on any channel make compromise adjustments of A21, A22 and A23 with channel switch set to that channel, then recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

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ARVADA, COLORADO

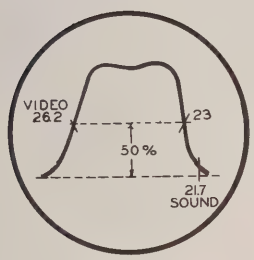


FIG. 1

FIG. 2

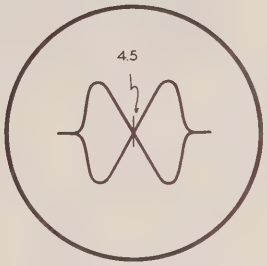


FIG. 3

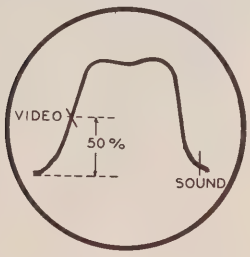


FIG. 4

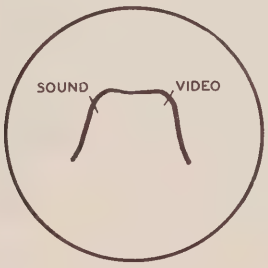
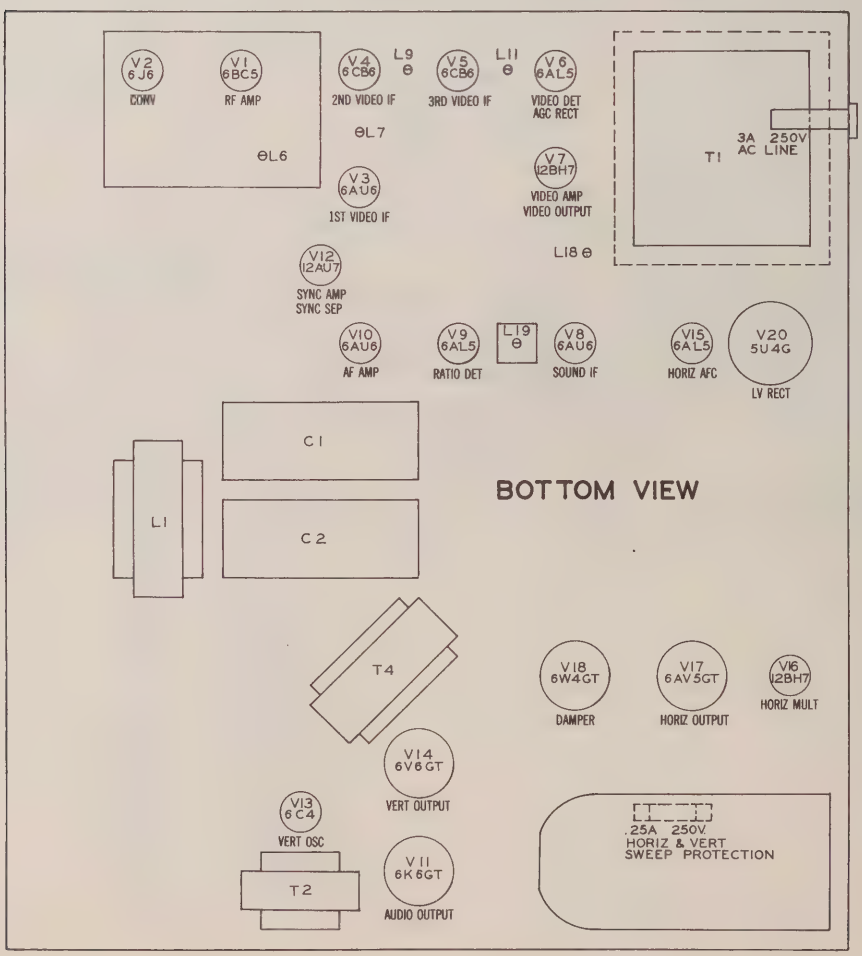


FIG. 5

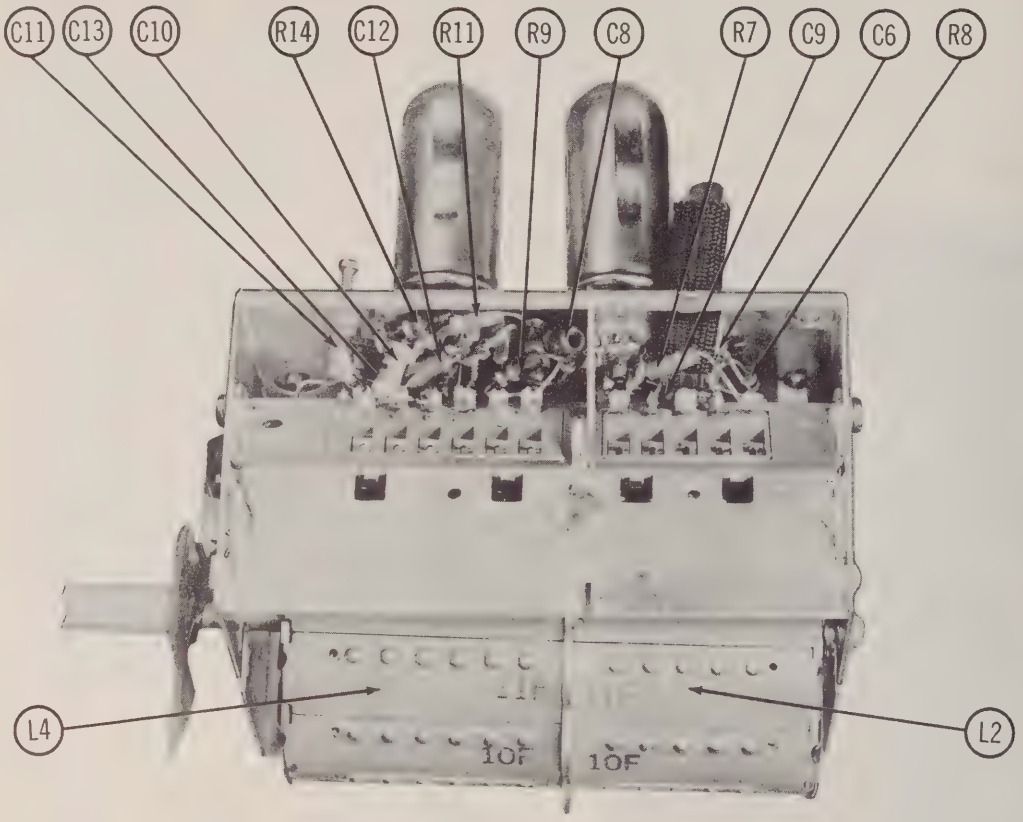
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1Meg	0Ω	.1Ω	0Ω	†5.5KΩ	†5.5KΩ	0Ω		
V 2	6J6	†7.9KΩ	†18.2KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6AU6	1Meg	0Ω	0Ω	.1Ω	†3.1KΩ	†3.1KΩ	82Ω		
V 4	6CB6	1Meg	47Ω	.1Ω	0Ω	†3KΩ	†3KΩ	0Ω		
V 5	6CB6	.6Ω	150Ω	.1Ω	0Ω	†2.9KΩ	†2.9KΩ	0Ω		
V 6	6AL5	.6Ω	220KΩ	.1Ω	0Ω	1.5KΩ	0Ω	4.8KΩ		
V 7	12BH7	†6KΩ	1Meg	0Ω	.1Ω	.1Ω	†5KΩ	4.7KΩ	500Ω	0Ω
V 8	6AU6	47KΩ	0Ω	.1Ω	0Ω	†1KΩ	†35KΩ	100Ω		
V 9	6AL5	1Meg	1Meg	0Ω	.1Ω	33KΩ	0Ω	0Ω		
V 10	6AV6	6.8Meg	0Ω	.1Ω	0Ω	0Ω	0Ω	†470KΩ		
V 11	6K6GT	0Ω	0Ω	†800Ω	†600Ω	470KΩ	♦470Ω	.1Ω	560Ω	
V 12	12AU7	†10.6KΩ	†1.5Meg	2.7KΩ	0Ω	0Ω	†1.5Meg	56KΩ	220KΩ	.1Ω
V 13	6C4	■2Meg	■1.9Meg	0Ω	.1Ω	■2Meg	2.2Meg	0Ω		
V 14	6V6GT	1.8KΩ	.1Ω	†720Ω	■57KΩ	6.8Meg	■2Meg	0Ω	1.8KΩ	
V 15	6AL5	390Ω	390Ω	.1Ω	0Ω	3.9Meg	0Ω	3.9Meg		
V 16	12BH7	†182KΩ	180KΩ	1.8KΩ	.1Ω	.1Ω	†6.1KΩ	3.3Meg	1.8KΩ	0Ω
V 17	6AV5GT	470KΩ	.1Ω	0Ω	INF	■33Ω	INF	0Ω	†12KΩ	
V 18	6W4GT	‡ 20Ω	INF	850KΩ	‡90Ω	†18Ω	INF	360KΩ	360KΩ	
V 19	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ■393Ω
V 20	5U4G	0Ω	22KΩ	360KΩ	26Ω	INF	24.6Ω	360KΩ	22KΩ	
V 21	21EP4	360KΩ	29KΩ	PIN 6 ■0Ω	PIN 10 ■0Ω	PIN 11 360KΩ	PIN 12 360KΩ			

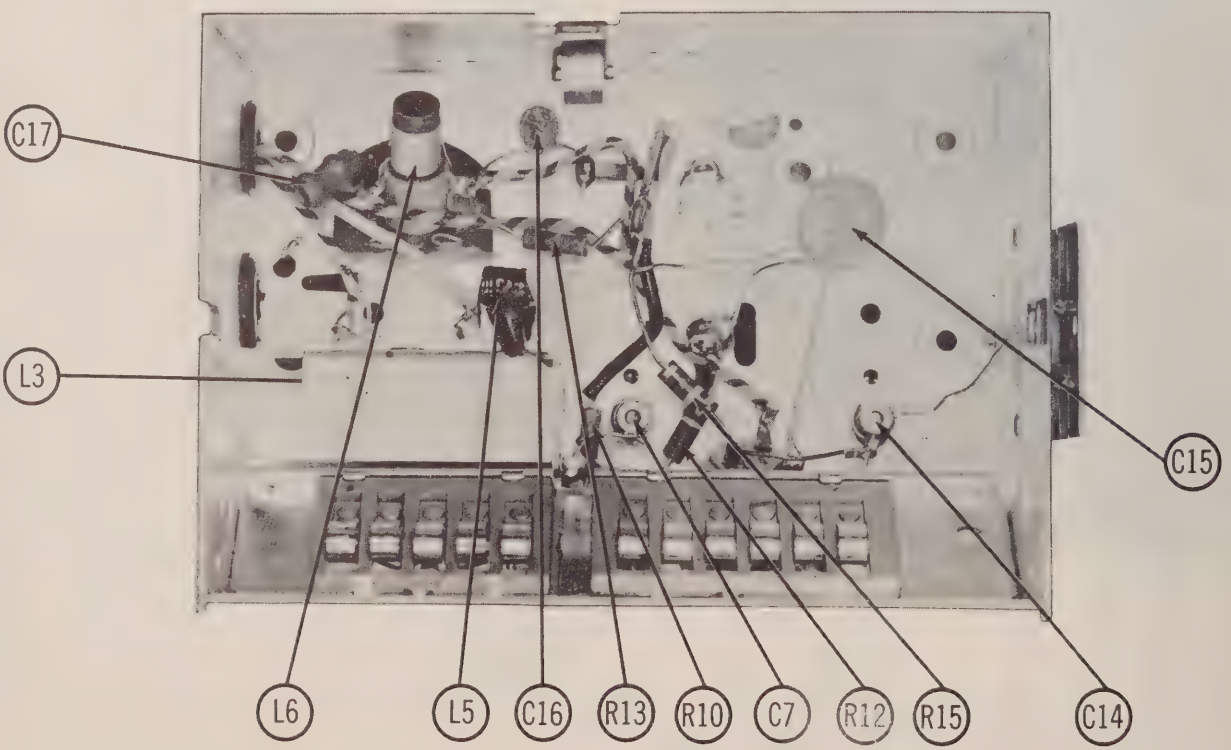
† MEASURED FROM PIN 8 OF V20
♦ MEASURED FROM PIN 4 OF V11
■ MEASURED FROM PIN 3 OF V18
‡ MEASURED FROM PIN 5 OF V18



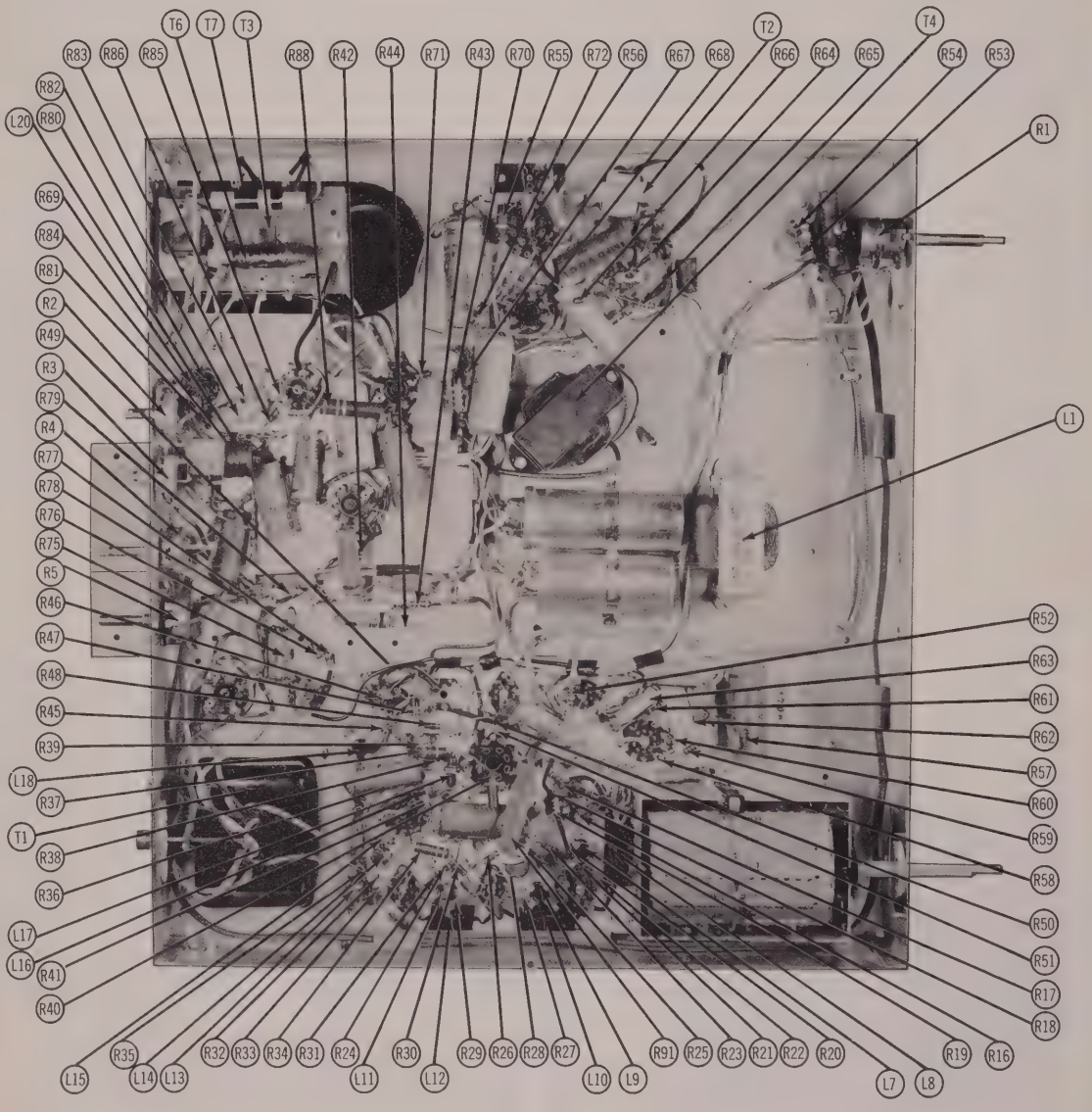
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



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3924 MEADE ST.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Check C63 and horizontal deflection yoke for open.

INSUFFICIENT SWEEP

Substitute V16, V17 and V18. Check C65 by disconnecting one end. Width should decrease if C65 is satisfactory. Check waveform at W14;

If Satisfactory	If Unsatisfactory
Check T3, T6, T7, C66 and C67. Check R88, C62 and other components associated with V17 and V18.	Check C60, C61 and other components associated with V16.

DRIVE LINES

Substitute V17 and V18. Check C66 and C67. Check adjustment of (B2). Check C60 and T3.

COMPRESSED AT LEFT SIDE

Substitute V16, V17 and V18. Check T6, C66 and C67. Check C62 and R88.

FOLDS

Substitute V17 and V18. Check C66, C67, T6, T3 and other components associated with V18.

XMAS TREE EFFECT

Check L20 and C58.

VERTICAL

LOSS OF SWEEP

Substitute V13 and V14. Check waveform at W7;

If Satisfactory	If Unsatisfactory
Check T4 and vertical deflection yoke.	Check T2, C49 and other components associated with V13.

INSUFFICIENT SWEEP

Substitute V13 and V14. Proceed as outlined under vertical loss of sweep.

COMPRESSED AT BOTTOM

Substitute V13 and V14. Check C1C, C3B, C50 and C51. Check C49 for leakage.

COMPRESSED AT TOP

Substitute V13 and V14 check C3B, C50, C51 and C49.

FOLDS

Substitute V13 and V14. Check T4 and other components associated with V14.

SYNC

HORIZONTAL

LOSS OF SYNC

Substitute V15 and V16. Check C52, C53, C55, C56, C57 and other components associated with the horizontal control circuit.

CRITICAL SYNC

Substitute V15 and V16. Proceed as authorized under horizontal loss of sync.

PULLING PICTURE

Check V16 and V17 for heater to cathode leakage. Check C56 and C57.

VERTICAL

LOSS OF SYNC

Substitute V13. Check vertical integrator network C47, T2 and other components associated with the vertical sync coupling and oscillator circuits.

CRITICAL SYNC

Substitute V12 and V13. Proceed as outlined under vertical loss of sync.

TRIGGERING

Substitute V12 and V13. Inspect circuit near these tubes for filament lead dress.

VIDEO

SOUND BARS

Check setting of local oscillator. Check adjustment of sound take off trap (A5). Check L16 and C72.

POOR RESOLUTION

Substitute V1, V3, V4, V5 and V6. Check video IF alignment. Check components of the video IF strip.

POOR CONTRAST

Substitute V6 and V7. Check L13 and C32. Check picture tube.

SMEAR

Substitute V6 and V7. Check L15 and L16 for open. Check R37, R38 and R41 for change of value.

ONE WIDE BLACK BAR ACROSS PICTURE

Check RF tuner, video IF, video detector and video amplifier tubes for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

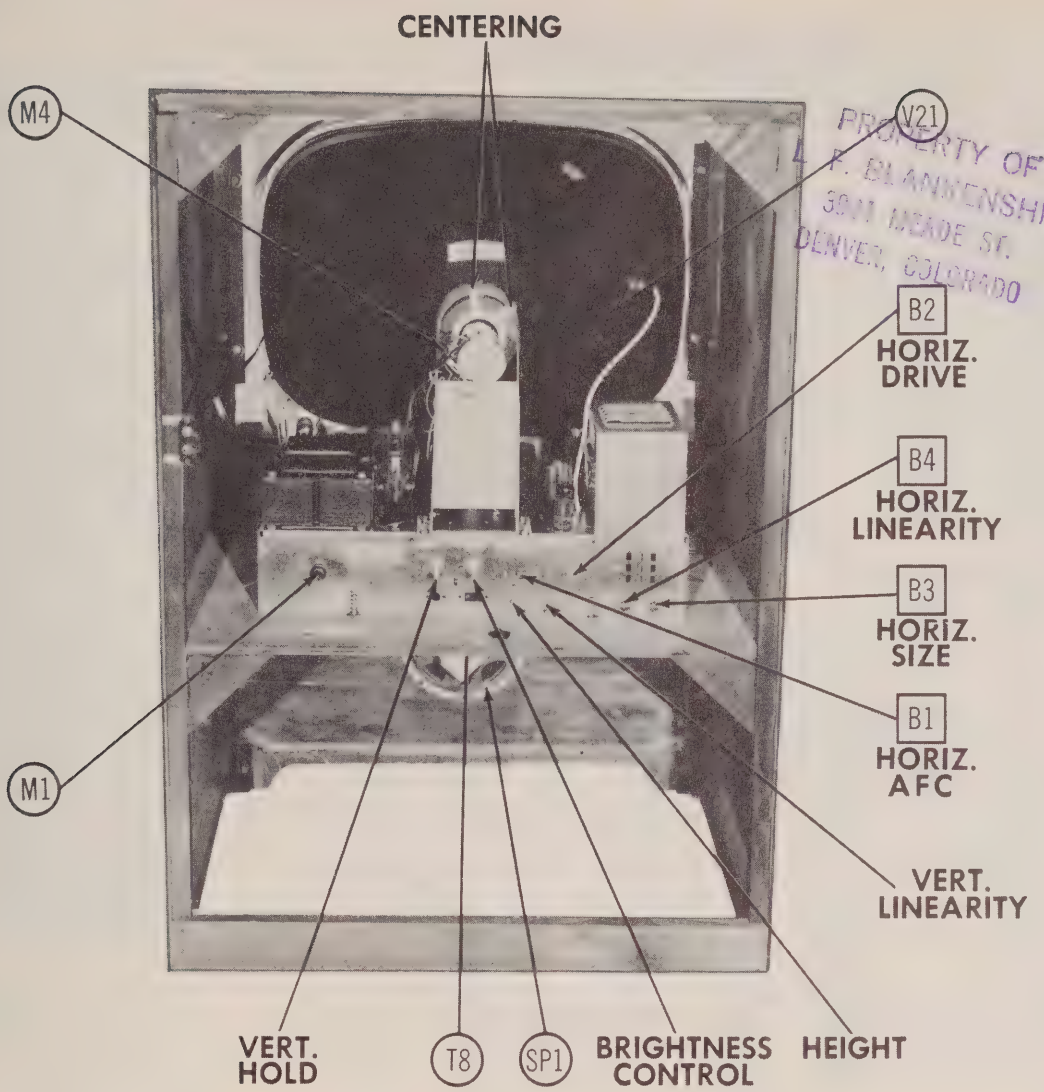
Substitute V8, V9, V10 and V11. Check sound IF and ratio detector alignment.

BUZZ

Readjust ratio detector secondary (A7). If buzz is still objectional substitute V9 and readjust A7.

DISTORTED

Check audio amplifier and output stages using signal generator. If no distortion is found check sound IF alignment and ratio detector adjustment.



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3911 MEADE ST.
DENVER, COLORADO

CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal AFC slug (B1) until the picture synchronizes horizontally. Check setting by switching of channel and back again.

If necessary retouch B1 until picture returns to sync immediately on making above check.

Adjust the horizontal drive trimmer (B2) counter clockwise as far as possible without the presence of vertical white lines or compression of the center of the picture.

Adjust the width slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RTMA BASE TYPE	NOTES
V1A	RF Amplifier	6BC5	6BC5	7BD	
B	RF Amplifier	6AG5	6AG5	7BD	
C	RF Amplifier	6CB6	6CB6	7CM	
V2	Converter	6J8	6J8	7BF	
V3	1st. Video IF Amp.	6AU6	6AU6	7BK	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector - AGC Rectifier	6AL5	6AL5	6BT	
V7	Video Amplifier-Video Output	12BH7	12BH7	9A	
V8	Limiter	6AU6	6AU6	7BK	
V9	Ratio Detector	6AL5	6AL5	6BT	
V10	AF Amplifier	6AV6	6AV6	7BT	
V11	Audio Output	6K6GT	6K6GT	7B	
V12	Sync Separator - Sync Phase Inv.	12AU7	12AU7	9A	
V13	Vert. Oscillator	6C4	6C4	6BG	
V14	Vert. Output	6V6GT	6V6GT	7B	
V15	Horiz. AFC	6AL5	6AL5	6BT	
V16	Horiz. Mult.	12BH7	12BH7	9A	
V17	Horiz. Output	6AV5GT	6AV5GT	6CK	
V18	Damper	6W4GT	6W4GT	6CG	
V19	HV Rectifier	1B3GT	1B3GT	3C	
V20	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: SYLVANIA PART No.		RTMA BASE TYPE	NOTES
V21	21FP4	21FP4 21FP44 ①		12C	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No	NOTES
C1A	a40	450		AFH3-43		CO34		FP376.8	R1320	
B	a40	450		PR8450/4		BR445		TC70		
C	4	450								
D	4	450		AFH3-43		CO34		FP376.8	TVL-3785	
C2A	a40	450								
B	a8	450								
C	a40	450								
C3A	25	50		PRS50/25		BR255A		TC36	R1319	Green Red
B	100	50		PRS50/100		BR8501		TC3501		
C4	4	100		PRS150/4		BR415				
C5	4	450		PR8450/4		BR445		TC70	TVA-1702	Note 1
C6	3-9				829-10					
C7	.5-3				829-3			CT585A		
C8	120			SU120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C9	1000			SU1000	D6-102	TM5D1	GP2K-102	UC-5321	5HK-D1	
C10	100			SU100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C11	.5-3				829-3			CT585A		
C12	30			SU20NP0	TCZ-30		N20K-200	ZT-542	5TCC-Q2	
C13	10			SU10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C14	.5-3				829-3					
C15A	1000			BPD-2X001	DD-2-103	TM5DD1	812-001	DC-521	5HK-3D1	
B	1000							DC-521		
C16	10			SU10N750	TCN-10		N750K-100	NT-541	5TCU-Q1	
C17	120			SU120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C18A	5000			BPD-2X0047	DD-2-502	TM5D5	811-005	DC-525	5HK-2D47	
B	5000					TM5D5	811-005	DC-525		
C19A	5000			BPD-2X0047	DD-2-502	TM5D5	811-005	DC-525	5HK-2D47	
B	5000					TM5D5	811-005	DC-525		
C20A	5000			BPD-2X0047	DD-2-502	TM5D5	811-005	DC-525	5HK-2D47	
B	5000					TM5D5	811-005	DC-525		
C21	180			SU180	D6-181		GP3K-181		5GA-T18	
C22	3						N90K-030	ZT-553		
C23	470			SU470	D6-471	TM5T5	GP2K-471	UC-5347	5GA-T47	
C24A	5000			BPD-2X0047	DD-2-502	TM5D5	811-005	DC-525	5HK-2D47	
B	5000					TM5D5	811-005	DC-525		
C25	.27	200		P488-25		PJ2P25		PT4025	2TM-P25	
C26	5000			BPD-006	MD-502	TM5D5	811-005	DC-525	5HK-Df	
C27	5000			BPD-005	MD-502	TM5D5	811-005	DC-525	5HK-D5	
C28	100			SU100	D6-101	TM5T1	GP1K-101	UC-531	5GA-T1	
C29A	5000			BPD-2X0047	DD-2-502	TM5D5	811-005	DC-525	5HK-2D47	
B	5000					TM5D5	811-005	DC-525		
C30	10			SU10	D6-100	5W5Q1	GP1K-100	UC-541	5GA-Q1	
C31	120			SU120	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C32	.05	600		P688-05	DF-503	PTE5S5		PT615	2TM-S5	
C33	.05	200		P688-05	DF-503	PJ2S5		PT415	2TM-S5	
C34	5									
C35	39			SU39	D6-390	5W5Q4	GP1K-390	UC-5439	5GA-G39	
C36	5000			BPD-005	D6-502	TM5D5	811-005	DC-525	5HK-D5	
C37A	5000			BPD-2X0047	DD-2-502	TM5D5	811-005	DC-525	5HK-2D47	
B	5000					TM5D5	811-005	DC-525		
C38A	1500			BPD-2X0015	DD-2-152	TM5DD15	812-0015	DC-5215	5HK-2D15	
B	1500							DC-5215		
C39	5000			BPD-005	D6-502	TM5D5	811-005	DC-525	5HK-D5	
C40	1000			BPD-001	DD-102	TM5D1	801-001	DC-521	5HK-D1	Note 1
C41	.025	600		P688-025		PTE5S22		TP451	6TM-S22	
C42	.005	600		P688-005	D6-502	PTE5D5	GP2-333-502	PT625	6TM-D5	
C43	.25			P688-25		PTE5P25		PT6025	6TM-P25	
C44	220			SU220	D6-221	5W5T25	GP3K-221	UC-5322	5GA-T22	
C45	.001	600		P688-001	D6-102	PTE5D1	GP2L-102	PT621	6TM-D1	Note 2
C46A	.002			P688-002		PTE5D2		PT622		
B	.005			P688-005	●PC-100	PTE5D5	●1405-01	PT625	●101C1	
C	.005			P688-005		PTE5D5		PT625		

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No	NOTES
C47	4700	500		1467-005	D6-472	1D5D5	GP2-333-472	MC465	1FM-25	
C48	.05	600		P688-05		PTE5S5		PT615	6TM-S5	
C49	.1	600		P688-1	DF-104	PTE5P1		PT601	6TM-P1	
C50	.25	600		P688-25		PTE5P25		PT6025	6TM-P25	
C51	.25	600		P688-25		PTE5P25		PT6025	6TM-P25	
C52	.001	600		P688-001	D6-102	PTE5D1	GP2L-102	PT621	6TM-D1	
C53	.001	600		P688-001	D6-102	PTE5D1	GP2L-102	PT621	6TM-D1	
C54	.01	600		P688-01	D6-103	PTE5S1	GP2-333-103	PT611	6TM-S1	
C55	.005	600		P688-005	D6-502	PTE5D5	GP2-333-502	PT625	6TM-D5	
C56	.005	600		P688-005	D6-502	PTE5D5	GP2-333-502	PT625	6TM-D5	
C57	.047	200		P288-047		PJ2S5		PT4147	2TM-S47	
C58	3900	500		1464-004		IDR5D4		MC8463	MS-24	
C59	330	500		1469-00035						
C60	330	500		1469-00035						
C61	470	500		1468-0005	D6-501	5W5T5	GP2K-471	MC245	1FM-35	
C62	.05	600		P688-05	DF-503	PTE5S5		PT615	6TM-S5	
C63	.25	600		P688-25		PTE5P25		PT6025	6TM-P25	
C64	.01	600		P688-01	D6-503	PTE5S1	GP2-333-103	PT611	6TM-S1	
C65	10	2000		HVD30-10		TM60Q1		MCP410	30GA-Q1	
C66	.05	600		P688-05		PTE5S5		PT615	6TM-S5	
C67	.1	600		P688-1		PTE5P1		PT601	6TM-P1	
C68	60	1000				TM10Q60				
C69	500	20000		HV20A	TV1-502	MM-420T5	413-501	HV-20035	20DK-T5	
C70A	5000			BPD-2X0047	DD-2-502	TM5D5	811-005	DC-525	5HK-2D47	
B	5000					TM5D5	811-006	DC-525		
C71	.05	200		P28 8-05		PJ2S5		PT415	2TM-S5	Note 1
C72	10			5I10	D6-100	5W5Q1	GP1K-100	UC-541	5GA-Q1	Note 1

Note 1. Not used in all Models.
Note 2. Some Models use .002MFD.
● Items C46A, C46B, C46C, R53A, R63B, R63C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2000Ω	½	50T10	QJ-379 *	RTV-87		UF23L	Contrast-Panel
B	1Meg	½					UR18A } †	Volume-Rear
C	Switch						UB-28	Attach to R1B
R2A	5000Ω	½	50T3	QU-114	AG-19-8	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	2.5Meg	½	50T2	QU-239	AG-84-8	AB-83	SU-585	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R4A	250Ω	½	50T16	QU-130	AG-40-8	AB-26	U-39	Brightness
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R4A
R5A	1Meg	½	PT-1008-1	QU-137	AG-81-8	B-69	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS-3	Not Req.	Not Req.	Attach to R5A
R6	50KΩ	½						Vert. Hold- see Note

Note , Not used in all Models.
* CONCENTRIKIT EQUIVALENT - KIT K-3, BASE ELEMENTS & SHAFTS B1T-1.10 & P1-123 (Panel)
B1S-137 & R1-209 (Rear) & SWITCH 78-1.
† Universal Replacement (Mallory exact duplicate part #UR2628)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R7	3900Ω	½		BTS-3900	
R8	47KΩ	½			
R9	4700Ω	½		BTS-4700	
R10	2200Ω	½		BTS-2200	
R11	10KΩ	½			
R12	220KΩ	½			
R13	15KΩ	½		BTS-15K	
R14	10KΩ	½			
R15	4700Ω	½		BTS-4700	
R16	100Ω	½		BTS-100	
R17	4700Ω	½		BTS-4700	
R18	82Ω	½		BTS-82	
R19	330Ω	½		BTS-330	
R20	100Ω	½		BTS-100	
R21	10KΩ	5%			
R22	47Ω	½			
R23	330Ω	½		BTS-330	
R24	820KΩ	½		BTS-820K	
R25	100Ω	½		BTS-100	
R26	100Ω	½		BTS-100	
R27	22KΩ	½			
R28	150Ω	½		BTS-150	
R29	33KΩ	½		BTS-33K	
R30	100Ω	½		BTS-100	
R31	220KΩ	½		BTS-220K	
R32	100Ω	½			
R33	4700Ω	½		BTS-4700	
R34	3300Ω	1		BTA-3300	
R35	100KΩ	1		BTA-100K	
R36	1Meg	1		BTS-1Meg	
R37	1800Ω	1		BTA-1800	
R38	3300Ω	2		BTS-3300	
R39	3300Ω	1		BTS-3300	
R40	1500Ω	1		BTA-1500	
R41	33KΩ	½		BTS-33K	
R43	330KΩ	½		BTS-330K	
R43	3900Ω	½		BTS-3900	
R44	8200Ω	½		BTS-8200	
R45	47KΩ	½			
R46	100Ω	½		BTS-100	
R47	47KΩ	1			
R48	1000Ω	½		BTS-1000	
R49	47KΩ	½		BTS-47K	
R50	15KΩ	½		BTS-15K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	NOTES
R51	33KΩ	½		BTS-33K	
R52	6.8Meg	½		BTS-6.8Meg	
R53	4700Ω	½		BTS-4700	
R54	470KΩ	½		BTS-470K	
R55	560Ω	1		BTA-560	
R56	470Ω	1		BTA-470	
R57	220KΩ	½		BTS-220K	
R58	56KΩ	½		BTS-56K	
R59	1.5Meg	½		BTS-1.5Meg	
R60	2700Ω	½		BTS-2700	
R61	3900Ω	½		BTS-3900	
R62	3900Ω	½		BTS-3900	
R63A	22KΩ	½		BTS-22K	
B	8200Ω	½	●	BTS-8200	
C	8200Ω	½		BTS-8200	
R64	1.5Meg	½		BTS-1.5Meg	
R65	4700Ω	½		BTS-4700	
R66	12KΩ	½		BTS-12K	
R67	100KΩ	½		BTS-100K	Note 1
R68	6.8Meg	½		BTS-6.8Meg	
R69	220Ω	½		BTS-220	
R70	47KΩ	1		BTA-47 K	
R71	10KΩ	½		BTS-10K	
R72	180KΩ	½		BTS-180K	
R73	560Ω	½		BTS-560	
R74	560Ω	½		BTS-560	
R75	390Ω	½		BTS-390	
R76	100KΩ	½		BTS-100K	
R77	100KΩ	½		BTS-100K	
R78	3.3Meg	½		BTS-3.3Meg	
R79	470KΩ	½		BTS-470K	
R80	1800Ω	½		BTS-1800	
R81	3900Ω	½		BTS-3900	
R82	180KΩ	½		BTS-180K	
R83	180KΩ	½		BTS-180K	
R84	2200Ω	½		BTS-2200	
R85	470KΩ	½		BTS-470K	
R86	100Ω	½			
R87	12KΩ	½		BTS-12K	
R88	3.3Ω	½			
R89	470KΩ	1			Note 2
R90	2750Ω	10		1 3/4A-3000	
R91	100Ω	10		1 3/4A-100	Note 2

Note 1. Some Models may use a 330KΩ resistor in this application.
Note 2. Not used in all Models.
● Items R63A, R63B, R63C, C46A, C46B, C46C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No	MERIT PART No.	CHICAGO PART No	TRIAD PART No	RCA TYPE No.
T1	117VAC ② 1.52A	552VCT .220ADC	5VAC ③ 3A	6.3VAC ④ 1.76A						

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No.	MERIT PART No	CHICAGO PART No.	TRIAD PART No.	RCA TYPE No.	NOTES
T2	230Ω	1110Ω		A-8125	A-3003	TBO-5	A-97X	20ST2	Vert. Osc. Trans.
T3	393Ω tap ⑤ 33Ω	19.3Ω tap ⑥-⑦, 8Ω, 10.3Ω		A-8130 ② ③ ④	HVO-10 ②	TFB-5 ④	D-14 ③		Horiz. Output Trans.
		SEC. 2 0Ω							
T4	720Ω	8Ω		A-8112	A-3036	TBO-5	A-99X	20ST2	Vert. Output Trans.
T5A	15Ω			DY-9A ⑦	MDP-70 ⑦	TY-5 ⑦	Y-21 ⑦	20SD1	Horiz. Deflection Coils
B	50Ω				⑦				Vert. Deflection Coils
T6	34Ω			WC-50 ①	MWC-1② ⑧	TWL-1	WC-11	21ZR1	Horiz. Lin. Coil
T7	1.3Ω				MWC-2⑦				Width Coil

① Enlarge mounting hole.
② Use with width coil WC-5.
③ See instruction sheet (schematic #3) packed with unit for terminal connections.
④ Use with width coil TWL-1.
⑤ Use with width coil WC-11.
⑥ Drill new mounting holes.
⑦ Replace original back cover.
⑧ Do not use secondary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No	MERIT PART No	CHICAGO PART No.	TRIAD PART No.	NOTES
T8	2.26KΩ	3.66Ω	220Ω	.8Ω		A-3876	A-2928	RO-2	S-2X	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: TRUETONE PART No.	JENSEN PART No	QUAM PART No.	NOTES
SP1	6"	PM	3.66Ω		ST-896 Mod. P7-U	7A21	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE @ CURRENT 1000 (%)	REPLACEMENT DATA: TRUETONE PART No.	STANCOR PART No.	MERIT PART No	CHICAGO PART No	TRIAD PART No
L1	.220ADC	71Ω	4.1 Hy.					

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TRUETONE PART No.	MILLER PART No.	MEISSNER PART No.	NOTES
L2	Ant. Coils	0Ω CT	0Ω				
L3	Fil. Choke	0Ω					
L4	RF, Mixer Grid & Osc. Coils	0Ω					
L5	Fil. Choke	0Ω					
L6	1st. Video IF	1Ω			6188 *	17-1004 *	
L7	2nd. Video IF	.4Ω	.4Ω			17-1062	
L8	Fil. Choke	0Ω			4604		1.5 Microhenries
L9	3rd. Video IF	.6Ω	.7Ω			17-1063	
L10	Fil. Choke	0Ω			4604		1.5 Microhenries
L11	4th. Video IF	.6Ω	.4Ω			17-1064	
L12	Fil. Choke	0Ω			4604		1.5 Microhenries
L13	Series Peaking Coil	7.5Ω			4642 ■	19-4120	120 Microhenries, wound on 12KΩ resistor
L14	Shunt Peaking Coil	8.5Ω			6180	19-3160	160 Microhenries
L15	Series Peaking Coil	7.5 Ω			4642 †	19-4121	120 Microhenries, wound on 8.2KΩ resistor
L16	Series Peaking Coil	7.5Ω			4642 †	19-4121	120 Microhenries, wound on 8.2KΩ resistor
L17	Shunt Peaking Coil	7Ω			4642	19-3125	120 Microhenries
L18	Sound IF	4.6Ω				17-3402	Tapped ⑨ .8Ω
L19	Ratio Det.	5.5Ω	2Ω CT		6205	17-3497	Tertiary Winding - .8Ω
L20	Horiz. Osc.	60Ω			6210	19-1575	

* Enlarge mounting hole.
■ Parallel with 12KΩ resistor
† Parallel with 8.2KΩ resistor

TRUETONE MODEL 2D1303A

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			TRUETONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3A 250V			312003 (3AG-3A)	341001	AGC-3	HKP
M2	3AG	1/4A 250V			312.250 (3AG-1/4A)	357001	AGC-1/4	4405

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	RF Tuner		
M4	Ion Trap		
B2	Trimmer		Horiz. Drive (25-280MMF)

TROUBLE SHOOTING AIDS (CONT.)

PROPERTY OF
L. F. BLANKENSHIP
DENVER, COLORADO

POWER

SMALL RASTER AND/OR DIM PICTURE

Substitute V20. Measure B+;

If Low	If Satisfactory
Check B+ filter network.	Proceed as outlined under insufficient high voltage.

DIM PICTURE WEAK SOUND

Substitute V20. Check B+ network for shorts. Check B+ filter capacitors.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Substitute V16, V17, V18 and V19. Check waveform at W14;

If Satisfactory	If Unsatisfactory
Check T3, R89, C69, C64, C65 and other components associated with V18 and V19.	Check setting of (B2). Check C61, C60 and other components associated with V16 and V17.

INSUFFICIENT HIGH VOLTAGE

Substitute V16, V17, V18 and V19. Proceed as outlined under loss of high voltage.

BLOOMING

Substitute V17 and V18. Check R89, R90 and C69. Check picture tube.

GENERAL

RASTER, NO SOUND, NO PICTURE

Substitute V1, V2, V3, V4, V5, V6 and V7. Check components of the video IF strip.

RASTER, SOUND, NO PICTURE

Check coupling network between video output stage and picture tube. Check picture tube.

TOTAL LOSS OF SYNC

Substitute V12. Check signal at W1 and W4 for overload and loss of sync signal. Check components associated with V12.

SET DEAD

Check Fuse (M1). Check AC interlock. Check low voltage rectifier V20.

INTERMITTANT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown above are assumed and are not indicative of the quality and workmanship of this receiving equipment.

SERVICING IN THE FIELD

PROF
L. F. BLANKENSHIP
2021 MEADE ST.
DENVER, COLORADO

TUNER OSCILLATOR ADJUSTMENTS

Touch up adjustments of the RF Tuner Oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessbile, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

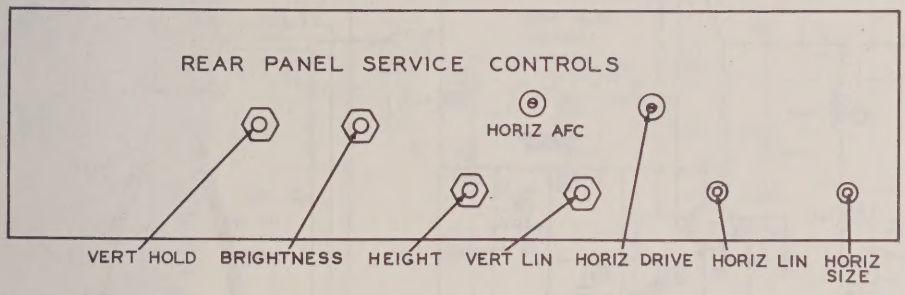
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis.

Adjust the Horizontal AFC slug until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector buzz, adjust the ratio detector secondary (L19) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used. One for horiz. sweep circuit protection and one for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push on type control knobs from front panel.
2. Remove 7 wood screws. Remove rear cover.
3. Disconnect built-in antenna. Remove 2 wood screws. Remove antenna bracket.
4. Disconnect speaker. Remove 2 speaker nuts. Remove speaker.
5. Remove 6 chassis bolts. Remove chassis.

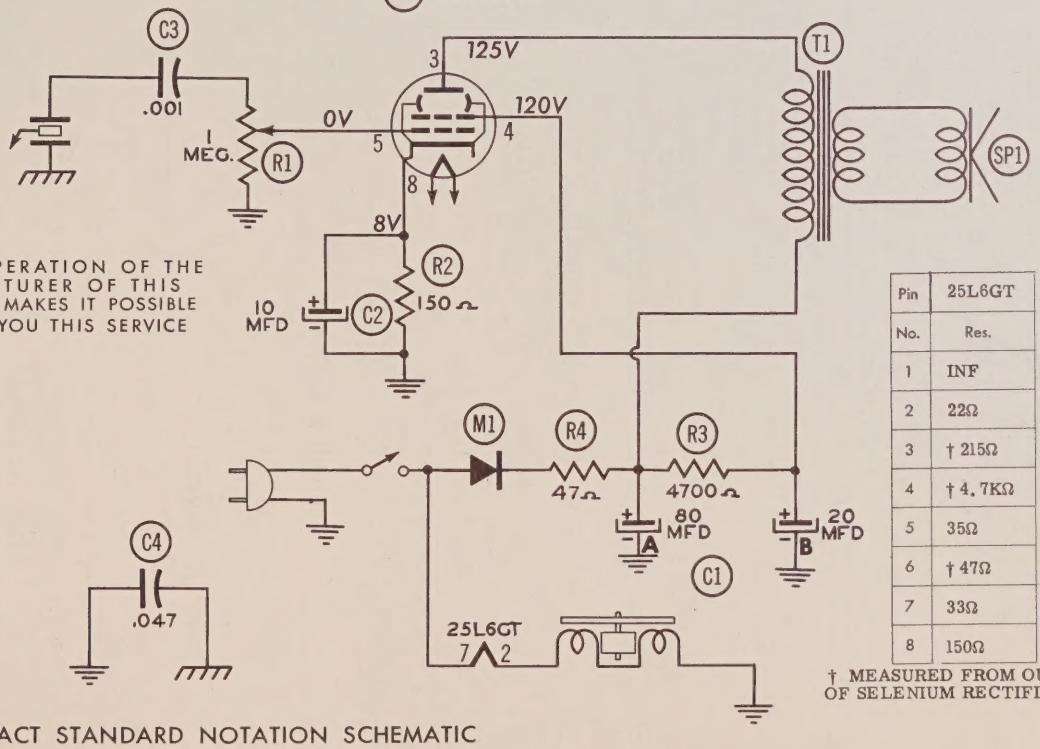
WEBCOR
MODELS B-136-1, F-136-1, T-136-1

WEBCOR
MODELS B-136-1, F-136-1, T-136-1

PROPERTY OF
L. F. [illegible] KENSHIP
33[illegible] MEADE ST.
DENVER, COLORADO.

TRADE NAME	Webcor Models B-136-1, F-136-1, T-136-1
MANUFACTURER	Webster-Chicago, 5610 Bloomingdale Ave., Chicago 39, Ill.
TYPE SET	AC Operated Phono Amplifier with 3 Speed Manual Record Player
TUBES (One)	Type 25L6GT Audio Amplifier
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .37 Amp. @ 117 Volts AC

AUDIO OUTPUT
V1 25L6GT



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

Pin No.	25L6GT Res.
1	INF
2	22Ω
3	† 215Ω
4	† 4.7KΩ
5	35Ω
6	† 47Ω
7	33Ω
8	150Ω

† MEASURED FROM OUTPUT OF SELENIUM RECTIFIER M1.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RTMA BASE TYPE	NOTES
		WEBCOR PART No.	STANDARD REPLACEMENT		
V1	Audio Output	53P065	25L6GT	7S	

CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	WEBCOR PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	80	150	30P136	PRS150/50-30-20		EDL44215		3N532	TVA-2460	Red
B	20	150								Blue
C2	10	25	30P064	PRS25/10		BR102A		TC22	TVA-1204	
C3	.001	600	30P046	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1	
C4	.047	400	30P154	489ZX-05		PJ4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	WEBCOR PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	31P054	Q13-137	AG-63-Z	BSK-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	WEBCOR PART No.	IRC PART No.	
R2	150Ω	½	29M1512	BTS-150	
R3	4700Ω	½	29M4722	BTS-4700	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	WEBCOR PART No.	IRC PART No.	
R4	47Ω	½	2M4702		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA					NOTES
	IMPEDANCE		DC RES.		WEBCOR PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	TRIAD PART No.	
	PRI.	SEC.	PRI.	SEC.						
T1	2.1KΩ	3.4Ω	166Ω	.57Ω	67P030	A-3876	A-2928	R0-2	S-2X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	WEBCOR PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.4Ω	76P025	ST-113 Mod. P4-X	4A07	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA					
	CURRENT	WEBCOR PART No.	SYLVANIA PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.
M1	.053A		NA5	8J1	1002A	6S65	65

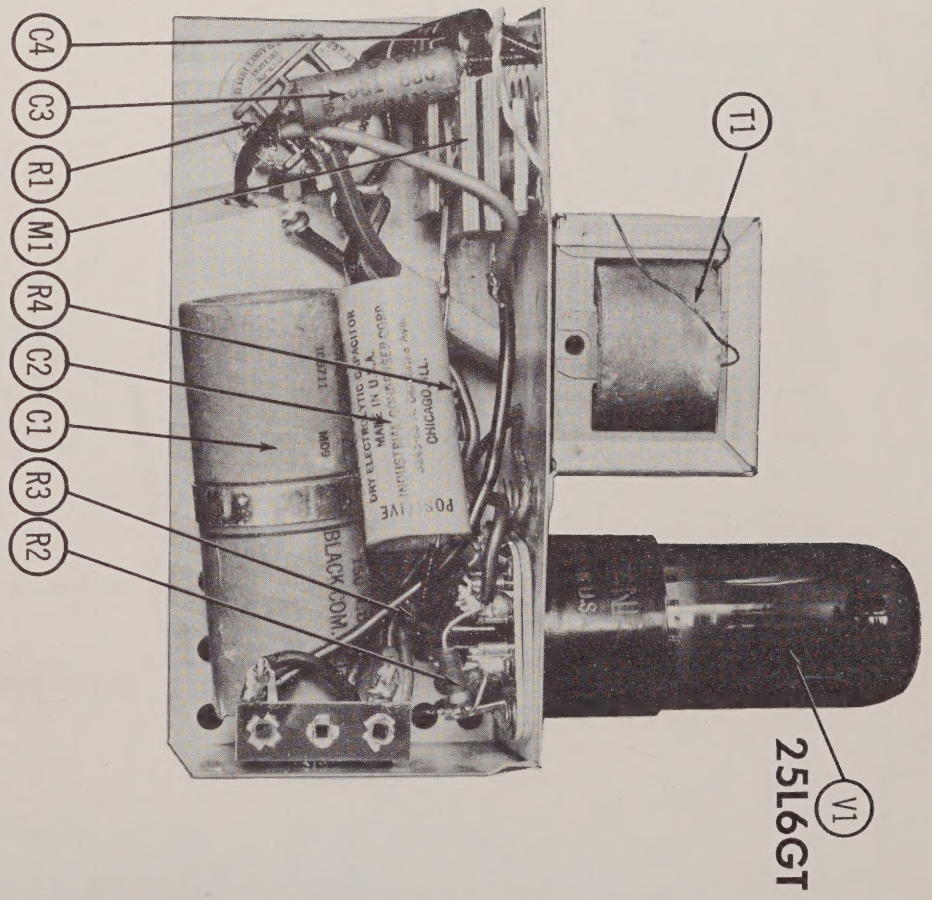
PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	WEBCOR PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2		L-29	Optional	W53MG	A64MG	H-60 *2400	Optional	* Tone Arm

ASTATIC, SHURE, AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	WEBCOR PART No.	WALCO PART No.	JENSEN PART No.	
M3		WS-400-2 or WA-400-2	J-752 or J-152	

CHASSIS—BOTTOM VIEW